DOCUMENT RESUME

ED 238 890 SP 023 742

TITLE	The Impact of Teacher Shortage and Surplus on Quality Issues in Teacher Education.
INSTITUTION	American Association of Colleges for Teacher Education, Washington, D.C.
PUB DATE	83
NOTE	110p.; Prepared by the Task Force on Shortage/Surplus/Quality Issues in Teacher Education.
PUB TYPE	Information Analyses (070) -- Reports - Research/Technical (143)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	*Educational Assessment; *Educational Quality; Higher Education; Mathematics Teachers; National Norms; Preservice Teacher Education; Program Effectiveness, Program Improvement; Schools of Education; Science Teachers; State Norms; *Teacher Education Programs; *Teacher Shortage; *Teacher Supply and Demand

ABSTRACT

A report is given on a task force exploration of teacher shortages and surpluses and the effect they have on the quality of teacher education programs. Data are presented for the nation, geographic regions, and 16 states: Arkansas, Florida, Georgia, Illinois, Kansas, Louisiana, Michigan, Minnesota, North Carolina, Missouri, Ohio, Oregon, Tennessee, Texas, Vermont, and Wyoming. Chapter 1 reviews the literature on supply and demand and presents an analysis of national, regional, and state data. Conclusions based on these data are also presented. Chapter 2 presents a mathematics and science case study which gathered, analyzed, and reported efforts underway to alleviate shortages in these fields. Chapter 3 is devoted to the issue of quality in teacher education programs. It reports on an analysis of a survey of actions being taken by schools, colleges, and departments of education to meet the increased demand for higher quality teacher education graduates. Chapter 4, the final chapter, presents conclusions and recommendations based upon the relationship between shortage/surplus/quality issues and change now occurring in teacher education. (JD)

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The Impact of Teacher Shortage and Surplus on Quality Issues in Teacher Education

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Task Force on Shortage/Surplus/Quality Issues
American Association of Colleges for Teacher Education

SP 023 742

THE IMPACT OF TEACHER SHORTAGE AND SURPLUS ON QUALITY ISSUES IN TEACHER EDUCATION

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1983
American Association of Colleges for Teacher Education

This report, The Impact of Teacher Shortage and Surplus on Quality Issues in Teacher Education, was presented to the AACTE Board of Directors in July 1983. The Board accepted the report and recommended that AACTE respond to the recommendations of the report as funds become available for that purpose.

Published by:
American Association of Colleges for Teacher Education
One Dupont Circle, Suite 610
Washington, D.C. 20036
(202) 293-2450

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PREFACE

In November 1981 the AACTE Board of Directors appointed a task force to monitor emerging concerns related to shortages and surpluses in teaching fields and the effect which these shortages and surpluses might have on the quality of teacher education programs. The Task Force on Shortage/Surplus/ Quality Issues in Teacher Education was convened in February 1982 and charged with: (a) dealing with issues of teacher supply, demand and quality in descriptive, analytic and prescriptive modes; and, (b) developing a report based on collected data, including recommendations for strategies to deal with emergent concerns.

Task force members decided to focus on the collection of existing data rather than the generation of new statistics to document supply/demand projections. With regard to quality issues, the task force's strategy was to document changes occurring in teacher education programs and determine whether these changes were perceived as enhancing the quality of those programs. The purpose of this two-fold effort was to produce recommendations for immediate and long-range action in teacher education.

The data on shortage/surplus issues are presented for the nation, geographic regions and selected states. A survey requesting teacher supply/demand data was sent to 18 states. Responses were received and analyzed for the following 16 states: Arkansas, Florida, Georgia, Illinois, Kansas, Louisiana, Michigan, Minnesota, Missouri, North Carolina, Ohio, Oregon, Tennessee, Texas, Vermont and Wyoming. In addition, the task force cooperated with the National Center for Education Statistics through the AACTE/NCES Committee on Shortages in Secondary Mathematics and Science to exchange national supply/demand data.

Chapter 1 reviews the literature on supply/demand and presents an analysis of the national, regional, and selected state-by-state data. Conclusions based on these data are also presented.

Chapter 2 presents a mathematics and science case study in which the results of an AACTE/NCES survey are reported. The purpose of this study was to gather, analyze and report efforts underway to alleviate shortages in mathematics and science teaching fields.

Chapter 3 is devoted to the issue of quality in teacher education programs. It reports an analysis of recent, selected literature on teacher quality and the results of a survey of actions being taken by schools, colleges and departments of education (SCDEs) to meet the increased demand for higher quality teacher education graduates.

Chapter 4 presents conclusions and recommendations based upon the relationship between shortage/surplus/quality issues and change now occurring in teacher education. These recommendations are intended to be the basis for an agenda for change in SCDEs.

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Chapter 1

TEACHER SUPPLY AND DEMAND

There is growing awareness among educators that teacher preparation programs and the teaching profession in general are affected in complex ways by changing patterns of teacher supply and demand. Many variables appear to affect the relationships between the job market and enrollment in teacher education programs, and between employment practices and quality instruction.

The focus of this chapter is presentation and analysis of data which indicate trends in the supply and demand of teachers in various fields throughout the nation. Knowledge of these trends is essential to effective planning, as it can be used to (a) make programmatic and personnel decisions in schools, colleges, and departments of education (SCDEs); (b) determine appropriate hiring practices by school systems; and (c) appropriate funds for education responsibility at state and national levels.

The chapter is divided into four major sections. The first one focuses on data relating to teacher supply and teacher demand at the national level. The second section focuses on data at the regional level, and the third is a summary of data from individual states. General conclusions are developed in the fourth section.

As data were analyzed, it was apparent that there were built-in limitations to the accuracy of what could be reported. Besides difficulties associated with any effort to project numbers three to five years into the future, some of the data were already four or five years old. A decision was made to use what was available rather than leave intentional gaps in the presentation of information.

In other studies, different procedures were used to collect information, different data were presented as equivalent, and terms such as "teacher supply" had different meanings depending on the author's perspective. The limitations are described in Appendix A in greater detail so that the reader may be provided with a context within which to read the information presented in this paper. No effort has been made to standardize the data that have been used in this report. The reader is urged to keep the limitations in mind and use them judiciously in interpreting what follows.

TEACHER SUPPLY AND DEMAND DATA AT THE NATIONAL LEVEL

In this section of the paper, information is presented to help clarify national supply and demand trends. Included are data on the availability of new teachers resulting from the pool of bachelor degree candidates in education and, more particularly, the smaller number who seek employment as teachers within a year of graduation. Alarming employment practices that directly pertain to issues of quality instruction are noted. The section concludes with a review of projections that indicate areas of shortage, surplus, and balance.

Trends in the Number of Education Graduates

While the total number of bachelor's degrees in education awarded has remained fairly steady since peaking in 1973-74, the number awarded in education has steadily decreased since 1972-73. As shown in Table 1, the number of bachelor degrees awarded in education in 1981 was 68,305 less than those awarded in 1971. If that rate of decline in education degrees has

Table 1

A Comparison of the Number of Education Bachelor's Degrees Awarded to the Total Number of Bachelor's Degrees Awarded and the Total Number of Graduates Prepared to Teach, 1971-1981

School Year End	Total Bachelor's Degrees	Education Degrees(1) Number	Education Degrees(1) % of Total	Graduates Prepared to Teach(2) Number	Graduates Prepared to Teach(2) % of BA & First Professional Degrees
1971	839,730	176,614	21.0	313,558	35.7
1972	887,273	191,220	21.6	317,254	34.1
1973	922,362	194,229	21.1	313,141	32.2
1974	945,776	185,225	19.6	279,145	27.9
1975	922,933	166,015	18.1	238,212	24.3
1976	925,746	154,807	16.7	222,049	22.5
1977	919,549	143,722	15.6	194,036	19.7
1978	921,204	136,141	14.8	181,348	18.4
1979	921,390	126,109	13.7	163,443	16.5
1980	929,417	118,169	12.7	143,935	14.4
1981	935,140	108,309	11.6	140,639	14.0
1982	952,998	101,113	10.6		

Note 1. The data in these columns are from The Condition of Education (p. 184) by National Center for Education Statistics, 1983. Washington, D.C.: U.S. Government Printing Office.
Note 2. The data in these columns are from Teacher Supply and Demand in Public Schools, 1981-82 (p. 21) by National Education Association, 1983. Washington, D.C.: Author.

continued, the number of 1982-83 education graduates should have been about half of the peak-year production of 1972-73. However, projections from the National Center for Education Statistics (NCES) suggest a slower rate of decline while projections from the National Education Association (NEA) show very little decline as shown in Table 2.

Table 2

Projected Numbers of New Education Graduates and Those Completing Preparation to Teach through 1988

Year	New Education Graduates(1)	Number Completing Preparation to Teach(2)
1982-83	108,130	143,000
1983-84	100,940	145,000
1984-85	93,390	145,000
1985-86	88,840	145,000
1986-87	81,950	148,000
1987-88	77,270	146,000
1988-89	73,530	143,000

Note 1. The data in this column are from Projections of Education Statistics to 1988-89 (p. 67) by M.M. Frankel & D.E. Gerald, 1980. Washington, D.C.: National Center for Education Statistics.
Note 2. The data in this column are from Teacher Supply and Demand in Public Schools, 1981-82 (p. 22) by National Education Association, 1983. Washington, D.C.: Author.

The considerable difference between the columns in both Tables 1 and 2 is due to the use of different data bases by NCES and NEA. The NCES figures on the number of education degrees include only those students who majored in education as reported under the Higher Education General Information System (HEGIS) taxonomy. This system tends to undercount the number of students who are eligible to teach by graduation, especially secondary teachers who major in an academic area while meeting the requirements for certification to teach. The NEA count is derived from all graduates who hold at least a bachelor's degree and who have completed minimum requirements for teacher certification for the first time. These projections include graduates of master's degree programs in education as well as post-baccalaureate certification programs. Neither of these groups is counted in the NCES figures. A comparison of all graduates who were prepared to teach from 1971-1981 reveals a decrease of 172,919--over one-half the number of 1971 college graduates in education. This figure indicates a more dramatic decrease in the numbers of new teachers annually than shown by an examination of education majors alone.

The trend is clearly articulated. The number of graduates with education majors will continue to decline through this decade while the supply of all newly qualified teachers will remain relatively constant.

A comparison of the number of bachelor's degree awarded during 1976 and 1980 in education and eight other fields reveals that education is no longer the first choice of students. Although ranking first in number of degrees awarded in 1976, education dropped to a distant second place behind business and management four years later. See Table 3.

Table 3
Number and Ranking of Nine Discipline Divisions in which the Largest Number of Bachelor's Degrees were Awarded: 1976 and 1980

Discipline Division	1976		1980	
	Number	Rank	Number	Rank
Education	156,528	1	120,680	2
Business and Management	145,035	2	189,224	1
Social Sciences	127,936	3	104,878	3
Biological Sciences	54,913	4	47,111	6
Health Professions	54,339	5	64,597	5
Letters	52,292	6	40,925	9
Psychology	50,363	7	42,513	7
Engineering	46,717	8	69,265	4
Fine and Applied Arts	42,371	9	40,953	8

Note. From Earned Degrees Conferred 1979-80 (p. 11) by C.O. Baker, 1981. Washington, D.C.: National Center for Education Statistics.

The cautious reader will have noted a discrepancy in the numbers provided for education during 1976 and 1980 in Tables 1 and 3. The latter increases by about 2,000 the numbers reported in Table 1, even though the source is the HEGIS taxonomy. NCES has made changes in what is included in the number of education graduates between the time that data was published for Table 3 (1981) and Table 1 (1982). The data in Table 1 are for the 50 states and Washington, D.C.; the data also include graduates who majored in English as a Second Language (ESL). Nevertheless, the figures in Table 3 are greater because they include Puerto Rico and other U.S. territories.

Data on Employment Patterns of New Graduates

Approximately half of the bachelor degree recipients qualified to teach are employed as full-time teachers a year after they graduate. Table 4 indicates that only 43% of the 1974-75 graduates, and 53% of the 1980-81 graduates, were teaching full-time in the spring following graduation.

Table 4

A Comparison of Numbers of Bachelor Degree Recipients who were Qualified to Teach, Applied to Teach, and Actually Taught 1976(1) and 1981(2)

Teaching Status	Number		Percent		Difference	% Change
	1976	1981	1976	1981	1976	1981
Newly qualified to teach	229,500	132,200	100	100	97,300	-42
Applied for teaching job	193,800	112,370	84	85	81,430	-42
Teaching	124,500	84,608	54	64	39,892	-32
Full-time	98,300	70,066	43	53	28,234	-29
Part-time	26,200	14,542	11	11	11,658	-44
Not teaching	69,300	26,440	30	20	42,860	-62

Note 1. The 1976 data are from New Teachers in the Job Market by J.L. Crane, 1983. Washington, D.C.: National Center for Education Statistics.
Note 2. The 1981 data are from The Condition of Education (p. 190) by the National Center for Education Statistics, 1983. Washington, D.C.: U.S. Government Printing Office.

Table 5 shows the percent of newly qualified graduates who were teaching in specific fields of education in Fall 1981. Trade, industrial, vocational, and technical graduates who applied for teaching jobs were more likely to be employed full-time than graduates of any other teaching field. Graduates in physical and health education were least likely to find a full-time teaching job. This finding is consistent with the ASCUS report (Akin, 1982b) which is summarized in Table 6. Since vocational and industrial education are listed as fields with considerable teacher shortage, hiring opportunities should be good. On the other hand, health and physical education are listed as fields with considerable surplus and consequently, present a less advantageous job market.

Table 5

Supply of and Demand for Beginning Teachers in Public Schools by Type of Assignment, Fall 1981

Assignment area	Estimated number completing preparation to teach	Estimated supply	Estimated demand	Supply minus demand	Supply as percent of demand
ELEMENTARY TOTALS.....	68,870	56,450	44,300	12,150	127.4
Regular instruction.....	55,900	47,250	33,050	14,200	143.0
Special education.....	11,970	9,200	11,250	-2,050	81.8
SECONDARY TOTALS.....	72,780	52,500	32,250	20,250	162.8
Agriculture.....	1,030	740	615	125	120.3
Art.....	3,930	2,810	1,095	1,715	256.6
Business education.....	3,995	2,855	1,355	1,500	210.7
Distributive education...	320	230	260	-30	88.5
English language arts....	8,760	6,265	3,710	2,555	168.9
Foreign languages.....	2,190	1,565	740	825	211.5
Home Economics.....	3,090	2,210	1,095	1,115	201.8
Industrial Arts.....	2,385	1,705	1,030	675	165.5
Mathematics.....	2,705	1,935	2,355	-420	82.2
Music.....	6,245	4,465	1,645	2,820	271.4
Physical & health education--boys.....	8,115	5,800	1,225	4,575	473.5
Physical & health education--girls.....	7,145	5,110	1,225	3,885	417.1
Natural & physical sciences.....	4,445	3,175	2,130	1,045	149.1
Social sciences.....	8,755	6,265	2,065	4,200	303.4
Trade, industrial, vocational, technical...	1,160	830	2,160	-1,330	38.4
Other secondary subjects.	130	90	1,385	-1,295	6.5
Special education.....	8,380	6,450	8,160	-1,710	79.0
TOTALS.....	140,650	108,950	76,550	32,400	142.3

Note. From Teacher Supply and Demand in Public Schools, 1981-82 (p. 36) by National Education Association, 1983. Washington, D.C.: Author.

The data on supply presented in Tables 4 and 5 omit consideration of one important question: To what extent are teachers hired to teach the subject(s) for which they are certified? The question becomes an issue if substantial numbers of first-year teachers are assigned to teach specialized areas for which they are not certified.

Table 6

Relative Demand by Teaching Area and Year in the Continental United States: Based upon a Survey of Teacher Placement Officers

	1982	1981	1980	1979	1978	1976
TEACHING FIELDS WITH CONSIDERABLE TEACHER SHORTAGE....(5.00-4.25*):						
Mathematics	4.81	4.79	4.80	4.68	4.40	3.86
Science-Physics	4.41	4.56	4.28	4.36	3.91	4.04
Industrial Arts	4.36	4.72	4.77	4.68	4.65	4.22
Vocational Agriculture	4.36	4.46	4.73	4.67	4.69	4.06
TEACHING FIELDS WITH WITH SLIGHT TEACHER SHORTAGE.....(4.24-3.45*):						
Special Education-LD	4.20	4.47	4.48	4.50	4.45	4.00
Bilingual Education	4.13	4.10	4.21	4.32	--	--
Science-Chemistry	4.13	4.42	4.18	4.09	3.97	3.72
Special Education-PSA	3.98	4.22	4.36	4.22	3.96	3.42
Speech Pathology/Audiology	3.95	4.27	4.17	3.83	3.83	3.68
Special Education-Multihandicapped	3.93	4.13	3.87	3.24	--	--
Science-Earth	3.89	4.08	3.64	3.82	3.50	3.44
Data Processing	3.86	--	--	--	--	--
Special Education-MR	3.84	4.14	4.23	4.39	3.52	2.87
Special Education-Gifted	3.81	4.10	4.33	4.56	3.95	3.85
Special Education-Reading	3.73	4.21	4.23	4.27	4.09	3.96
Science-Biology	3.66	3.98	3.50	3.49	3.11	2.97
School Psychologist	3.56	3.70	3.87	3.43	3.68	3.09
Business	3.47	3.50	3.80	3.65	3.52	3.10
TEACHING FIELDS WITH BALANCED SUPPLY AND DEMAND.....(3.44-2.65*):						
Music-Instrumental	3.28	3.33	3.65	3.33	3.30	3.03
English	3.21	3.37	3.51	2.78	2.30	2.05
Library Science	3.12	3.31	3.58	4.26	--	--
Music-Vocal	2.95	3.06	3.32	2.97	3.03	3.00
Counselor-Secondary	2.79	3.13	3.76	3.03	3.31	2.69
Driver's Education	2.77	2.87	2.98	3.06	2.63	2.44
Speech	2.76	2.65	2.50	2.47	2.48	2.46
Counselor-Elementary	2.72	3.05	3.38	2.96	3.00	3.15
Language, Modern-Spanish	2.68	2.95	3.34	2.88	2.84	2.47
TEACHING FIELDS WITH SLIGHT SURPLUS OF TEACHERS.....(2.64-1.85*):						
Journalism	2.61	2.77	2.98	2.50	2.54	2.86
Language, Modern-French	2.49	2.58	2.68	2.49	2.15	2.15
Langauge, Modern-German	2.48	2.58	2.70	2.17	2.28	2.03
Home Economics	2.43	2.54	2.85	2.67	2.37	2.62
Social Worker (School)	2.34	--	--	--	--	--
Elementary-Intermediate	2.26	2.56	2.84	2.33	1.97	1.90
Social Science	2.11	2.05	1.98	1.83	1.51	1.51
Elementary-Primary	2.02	2.24	2.77	2.19	1.84	1.78
Health Education	1.90	2.24	2.17	2.16	2.38	2.27
TEACHING FIELDS WITH CONSIDERABLE SURPLUS OF TEACHERS...(1.84-1.00*):						
Art	1.84	2.00	2.45	2.06	1.72	2.14
Physical Education	1.72	1.80	1.82	1.67	1.86	1.74

*5 = Greatest Demand; 1 = Least Demand

Note. From ASCUS Supply/Demand by J.N. Akin, January 1982. Manhattan, KS: Kansas State University.

According to information provided by NCES (Condition, 1983), there were approximately 5,000 elementary and secondary teachers hired from the pool of 1979-80 bachelor's degree graduates who were not eligible for certification. In addition, nearly 13,000 of the newly qualified, full-time certified teachers were actually teaching an academic field for which they had not been certified. Thus, the basic supply of potential teachers was augmented by the quiet influx of uncertified graduates.

The issue is clouded by a practice that distorts the authentic relationship between supply and demand, between surplus and shortage. As teacher educators, we must be willing to examine employment practices that result in the selection of graduates who have not completed certification programs. Although research that has focused on the quality of instruction by certified and uncertified teachers was not reviewed, task force members believe that quality teaching is compromised each time appropriate qualifications are not met.

Trends in the Demand for Teachers

The fact that the pool of teacher graduates has shrunk is no cause for alarm as long as supply and demand are balanced. As data on the projected demand for teachers was reviewed, a different message was repeated. In 1985 the nation will enter a period of demand for teachers that increasingly exceeds the projected supply of new teachers. Documentation of this impending shortage is based on birth rate data used to project the enrollment figures shown in Table 7. The data indicate an end to declining enrollments in the K-8 public

Table 7

Enrollment in Grades K-8 and 9-12 of Regular Day Schools: 50 States and D.C. (In thousands)

Year (fall)	Total public and private		
	K-12	K-8	9-12
1982	44,544	30,761	13,783
1983	44,165	30,623	13,542
1984	44,039	30,505	13,534
1985	44,166	30,551	13,615
1986	44,556	31,059	13,497
1987	45,004	31,787	13,217
1988	45,358	32,522	12,836
1989	45,905	33,347	12,558
1990	46,667	34,244	12,423

Note. From Projections of Education Statistics to 1990-91 (p. 34) by M.M. Frankel & D.E. Gerald, 1982. Washington, D.C.: National Center for Education Statistics.

and non-public schools by 1985, followed by continuing increases in enrollments through 1990 (Frankel & Gerald, 1982). When this population moves into the high school ten years later, shortages will appear there as well.

Considerable teacher shortages have existed nationwide for years in the fields of mathematics, physics, industrial arts, and vocational agriculture. Slight shortages have characterized bilingual education, special education, school psychology, and chemistry (Akin, 1982). A general teacher shortage can be expected to exacerbate the situation in these fields as well.

Data from Table 8 reveal that the demand for additional teachers will be greater than the supply of new teacher graduates in the mid-1980s. NCES and NEA projections of supply and demand through 1990 differ as shown in Table 8. Figure 1 suggests that the past trend characterized by significant oversupply during the past decade will reverse and possibly stabilize during the years 1986-1990.

Table 8

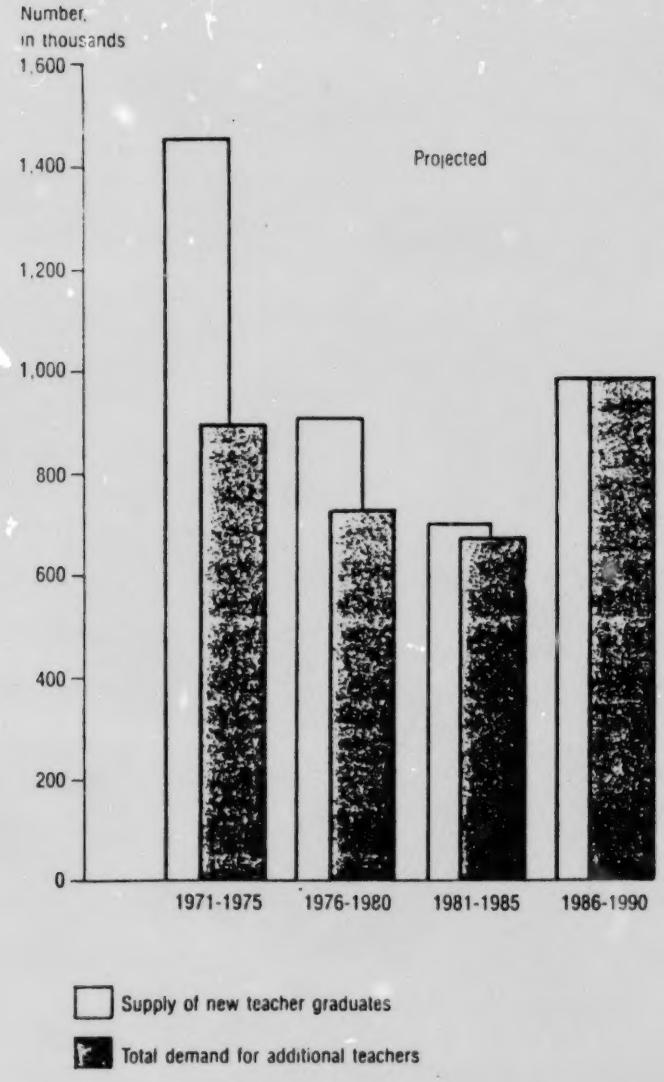
Projected Numbers of Newly Qualified Teachers and Those Completing Preparation to Teach through 1989

Year	New Education Graduates(1)	Supply as % of Demand(1)	Number Completing Preparation to Teach(2)	Supply as % of Demand(2)
1982-83	138,000	94.5	143,000	171.9
1983-84	138,000	97.2	145,000	121.7
1984-85	135,000	77.1	145,000	124.4
1985-86	156,000	83.4	145,000	91.8
1986-87	177,000	92.2	148,000	88.4
1987-88	197,000	104.2	146,000	84.2
1988-89	218,000	110.1	143,000	82.1

Note 1. Data in this column are from The Condition of Education (p. 182), National Center for Education Statistics, 1983. Washington, D.C.: U.S. Government Printing Office.
Note 2. Data in this column are from Teacher Supply and Demand in Public Schools, 1981-82 (p. 22) by National Education Association, 1983. Washington, D.C.: Author.

Figure 1

Estimated Supply of New Teacher Graduates and Estimated Total Demand for Additional Teachers



In the mid-1980's, the supply of new teacher graduates is expected to approximate the demand for additional teachers, given continuing declines in supply and anticipated increases in demand.

Note. From The Condition of Education (p. 183) by the National Center for Education Statistice, 1983. Washington, D.C.: U.S. Governement Printing Office.

TEACHER SUPPLY AND DEMAND DATA IN GEOGRAPHIC REGIONS

Specific conditions within any region of the country may lead to supply and demand data that vary considerably from the national trends. Although no effort is made in this section of the report to assess the impact of those conditions, analysts need to be sensitive to the degree to which they affect and thus help explain the following regional differences:

- o economical: growth vs. decline, labor importer vs. labor exporter.
- o political: progressive and supportive reputation vs. a regressive reputation as it affects unusual changes in funding levels or program requirements.
- o educational: salary level, school climate.

The Association for School, College, and University Staffing Service (ASCUS) annually surveys selected college and university placement officers and selected school administrators in local districts. Table 6 shows fields of teacher shortage and surplus for a six-year period. Forty-one teaching fields are ranked as having severe surpluses, surpluses, a balance, shortages, or severe shortages. The detail provided in the ASCUS reports (Relative, 1982) is useful because it reports specific rather than broad teaching fields. Thus substantial differences among the subfields such as biology and physical science cannot be masked. These details are particularly important to teachers, employers, and policy-makers who are concerned about rectifying severe imbalances between supply and demand in specific fields.

For the nine regions excluding Alaska and Hawaii, the seven fields of greatest shortage had the following range of ratings:

	Low	High
Mathematics	4.00	5.00
Science-Physics	3.83	5.00
Industrial Arts	3.80	4.80
Vocational Agriculture	4.00	5.00
Special Education-LD	3.57	5.00
Bilingual Education	3.33	4.67
Science-Chemistry	3.14	5.00

Although Hawaii's supply/demand ratings are similar to those in the continental U.S., Alaska's are not. Alaska's fields of considerable shortage include bilingual, business, home economics, industrial arts, library science, music, and special education. Alaska's fields of considerable surplus include art, elementary, health, all fields of science, and social science. The remainder of this section describes supply and demand in different geographic regions.

Northeast Region

This section of the country is characterized by sharp declines in the numbers of new teacher graduates. From 38,716 in 1971-72 to 16,801 in 1978-79 in New York; and from 1,042 to 522 in Maine during the same period. There are also declines in the numbers of teaching vacancies listed. The latter has resulted in an oversupply of elementary and secondary teachers in all areas except special education, industrial arts, vocational education, and science-math. Although New York and New Jersey are portrayed as states that will experience teacher shortages, Rhode Island, New Hampshire and Maine will not (Applegate and McCleary, 1982).

Midwest Region

Compared to the Northeast region, the Midwest appears to have experienced less severe declines in both the number of vacancies and the number of new teacher graduates. In South Dakota, for example, the number of new teacher graduates was reported to be 3,642 in 1972-73 and 3,343 in 1978-79; at the University of Iowa during the same periods of time the figures were 5,733 and 3,308 respectively. On the other hand, Colorado State University reported 567 new teacher graduates in 1970-71, 346 in 1975, and an increase to 448 in 1978-79.

Applegate and McCleary (1982) reported that teacher shortages within the next five years are anticipated in South Dakota, Minnesota, Kansas, and Iowa with current critical shortages being reported in math, science, industrial education and special education. In addition to these shortages, Kansas is experiencing slight shortages in music, vocational agriculture, and reading teachers. Iowa is reporting shortages in vocational agriculture teachers.

Southern Region

Applegate and McCleary (1982) found that the decline of vacancies and new teacher graduates, though steady since the early seventies, is not as severe as the condition in the Northeast Region. In general, teacher shortages are expected in the next five years. These will be in addition to existing shortages of math, science, special education, and industrial arts teachers in Louisiana, Georgia, and Arkansas. Arkansas is also experiencing shortages in vocational agriculture, distributive education, music, and foreign languages.

Data received were insufficient to provide trends for the Southeast, but Applegate and McCleary (1982) point to declines in the number of new teacher graduates and number of vacancies listed. North Carolina reported a decrease from 7,273 to 5,516 in new teacher graduates between 1972-73 and 1978-79. The number of vacancies that were reported declined from 5,365 to 1,866 between 1970-71 and 1978-79. Teacher shortages in math, science, special education, agricultural education, and industrial arts were noted in North Carolina and Virginia.

Western Region

In their report, Applegate and McCleary (1982) document trends in the decline of new teacher graduates and vacancies that were consistent with those reported for the other regions. Washington, for example, has experienced a decline in the former from 5,685 in 1971-72 to 2,537 in 1978-79. Exceptions to the overall decline in reported vacancies are the University of California at Los Angeles and the Hawaii Department of Education. Both report increases in listed vacancies each year since 1973-74.

A general teacher shortage in the Western region is anticipated during the next five years with the exception of Hawaii and Nevada. Present shortages of math, science, special education, and industrial arts teachers characterize the Western region. In California there are additional shortages of bilingual education teachers.

Summary

Each region of the country has experienced declines in the number of new teacher graduates and the number of vacancies, but not to the same extent. The Northeast shows the most severe drop in numbers, and it has an oversupply of elementary and secondary teachers in all but a few select areas. General shortages in the next five years are not expected to increase in the Northeast, but they are expected in the Midwest, Southern, and Western regions.

Teacher shortages in all four regions are occurring in math, science, industrial arts, and special education. Shortages in bilingual education exist in California, and there are overall shortages in vocational education in the Northeast. These patterns match national trends that show a continued decline in the number of graduates in education and continuing shortages in math, science, industrial arts, and special education.

TEACHER SUPPLY AND DEMAND DATA IN SELECTED STATES

There can be variation in teacher supply and demand conditions among states within any region. Differences among states and within a state can occur because of these characteristics:

- o urban, suburban, and rural characteristics which affect mobility between and within states;
- o relative salary levels;

- o job opportunities;
- o geographic characteristics such as mountains or coastal areas, which may contribute to variations from state or regional data; and,
- o the presence or absence of a nearby teacher education program.

However, no attempt has been made to determine how information about states has been affected by these factors. Both colleges and local school districts must consider them when interpreting local and state patterns. This section of the chapter contains an overview of reports from states which responded to the task force's request for information. Table 9 summarizes specific information on supply and demand in the 16 responding states.

According to Teachers for Florida Schools: Personnel Projections (1982), three factors contribute to teacher shortages in that state:

1. efforts of the state to increase the quality of teachers;
2. current salary levels that are not competitive; and
3. the state test requirement for admission to teacher education institutions.

Findings of a survey sent to teacher training institutions in Florida showed that this admissions requirement was affecting their enrollments in the following ways: reductions from 10%-40%, a drop in black admissions, a decrease in industrial arts by 75%, and a drop of 50% in the number of transfers from community colleges.

Georgia provides an example of how the supply can change radically. Galambos (1980) notes:

> In the summer of 1979, Georgia received much attention by reporting what appeared to be a serious teacher shortage, with 9,000 vacancies projected for the fall and less than 3,000 new teachers graduated that year. But by September of 1979, this vacancy total had dropped to less than 500. Why the sudden shifts? According to officials in Georgia, fewer teachers chose to leave the profession and many teachers from Alabama, North Carolina, California, and the Midwest sought and found jobs in Georgia. In spite of Georgia's generally lower beginning salaries, the lack of jobs in these other states, aided by an intensive recruiting effort by the state, helped create a sizeable in-migration. And the anticipated teacher shortage was greatly reduced.

Although Georgia continues its practice of heavy recruitment in the Midwest to help offset shortages, experience indicates that many teachers who migrate out-of-region do not stay long. This effort to meet demand may have only short-term benefits.

For 1980-81 education graduates in Kansas, the following conditions were reported:

Table 9

SUMMARY OF RESPONSES FROM STATES

State	Supply/Demand Issues	Current Shortages																			Comments
		Science	Math	Ind. Art	Voc. Ag	Spec Ed	Physics	Chemistr	Lrn Dis	Emot Handicap	Speech Pathology	Lang Arts	Elem Ed	Bilingual	Music	English	Reading	Other			
Arkansas	Supply will exceed demand through 1980s; no general shortage expected in next few years	*	*								*										
Florida		*	*	*	*				*	*		*									Shortages have resulted in increasing numbers of LEAs establishing out-of-state recruitment teams for the first time in more than 10 years.
Georgia	Supply expected to decrease from 2,750 to 2,500 from Fall 81 to Fall 83. Openings to decrease from 7,000 to																				
Illinois			*	*			*	*				*				*		Home Economics Vocational Ed			Surpluses in art, elementary ed, foreign language, health, physical education & social studies. Oversupply in large suburban areas; smaller, rural LEAs are having difficult time recruiting qualified candidates.
Kansas	Students completing first time certification requirements dropped from 3,500 in 1972 to 1,500 in 1982.		*	*	*	*	*				*										
Louisiana	Teacher education enrollment declined nearly 50% in last 10 years.	*	*			*							*								Number of graduates has been reduced since 1977 because of rather high NTE cut-off scores. 69% of 617 positions filled by non-certified personnel were in special education.

Table 9

SUMMARY OF RESPONSES FROM STATES

State	Supply/Demand Issues	Current Shortages																		Comments
		Science	Math	Ind. Art	Voc. Ag	Spec Ed	Physics	Chemistr	Lrn Dis	Emot Handicap	Speech Pathology	Lang Arts	Elem Ed	Bilingual	Music	English	Reading	Other		
Michigan	Teacher supply has decreased sharply: in 1978-79, 8,641 provisional certificated; in 1979-80, 7,550; projected in 1983-84, 5,100.								*					*				Spanish Voc Trade		Surpluses in art, social science, biology, environmental studies, business ed, French, English, speech, journalism, industrial arts.
Minnesota	Production in 1972 was 7,809; in 1981, 2,731.	*	*		*	*									*	*				Serious shortages projected in all fields and thinning of all surpluses. Current surpluses in physical education, social sciences, art, health, & foreign language. Placement rate of teacher education graduates remains relatively steady (65-75%).
Missouri		*	*													*		Vocational Ed		Surpluses in Elementary Ed, Physical Ed, and Special Ed.
North Carolina		*	*		*	*	*	*									*	Latin		Extremely liberal with regard to out-of-field teaching.
Ohio	At the elementary level, supply of teachers decreased 56% between 1977 and 1982. Supply of secondary teachers has also steadily decreased. Demand has decreased, but not nearly as fast as supply of newly certified teachers.																			
Oregon			*	*	*													Business		Surpluses in art, health, physical education, and social studies.

Table 9

SUMMARY OF RESPONSES FROM STATES

State	Supply/Demand Issues	Current Shortages																			Comments
		Science	Math	Ind. Art	Voc. Ag	Spec Ed	Physics	Chemistr	Lrn Dis	Emot Handicap	Speech Pathology	Lang Arts	Elem Ed	Bilingual	Music	English	Reading	Other			
Tennessee	Many person who complete teacher education requirements are not majors in education. State has adequate supply of teachers.		*																		Teachers most plentiful in elementary education, secondary ed, music, art, physical ed, social studies & health.
Texas	Public concern because of LEA practices resulting in hiring less than fully qualified personnel or leaving positions unfilled. Annual shortfall of 4,340 teachers.	*	*			*								*				Vocational ed			
Vermont		*	*															Business Ed			Special education experiences shortages in some specialties & oversupply in others. The greatest surplus is elementary education.
Wyoming	No fields of severe shortage or surplus.	*	*			*					*			*			*	Foreign Lang			Moderate surplus of teachers in physical ed, early childhood, elementary, and social studies.

- o Teachers who can and will, go where the jobs are, to be employed.
- o Inadequate funding for school budgets, as well as reduced enrollments, have caused some schools to reduce the number of teaching positions.
- o Mathematics and science majors, especially those with computer concentrations, are choosing business and industry in lieu of teaching postions.
- o Advanced courses in science and math, as well as industrial education, have been eliminated or postponed in some institutions, due to lack of teacher candidates and/or funding.
- o When compared to the national report, opportunities for teachers in general are greater in Kansas.
- o When comparing overall job markets for teachers for the 1980, 1981, and 1982 reports, respondents have generally indicated that opportunities are diminishing. (Akin, 1982a)

The requirements for certification in Louisiana were changed dramatically in 1977 when the legislature mandated a proficiency examination as a prerequisite to certification. The scores required are rather high compared to similar scores in other states which use the National Teacher Examination (NTE) for certification. The number of graduates who are certified has been reduced as a result of failure to achieve the cutoff score. Many graduates, particularly blacks, are successfully recruited by other states.

In 1981 a state department telephone survey of all Louisiana school districts revealed that 69% of 617 positions filled by non-certified personnel were in special education and elementary education (Teacher Supply and Demand, 1982). Testimony indicated that although the hardest hit districts seem to be the rural border parishes, almost every district was experiencing some shortages.

Roth (1981) reported that the Michigan Education Association (MEA) had been studying supply-demand imbalances for several years and in 1978 proposed a moratorium on training student teachers in all areas except those identified as being in demand or those chosen by teachers who were being recertified. This proposal has not been adopted. In 1980 an MEA task force recommended that local school districts accept student teachers only in areas of undersupply or balance, and that teachers avoid using colleges and universities that continue to create surpluses. This reference by a teacher oranization to controlling oversupply is the only one that came to the attention of the task force.

The Minnesota Association of Colleges of Teacher Education adopted a position statement in 1982 entitled Teacher Supply and Demand in Minnesota: An Alternative View. In it, Ames (1982) presented a response to suggestions that the state intervene to adjust imbalances in teacher supply. He argues that the placement rate of teacher education graduates remains relatively steady (65-75%) regardless of the demand for teachers and that the state should not attempt to manipulate career choice by controlling access to programs. The paper calls for continuation of assurance of selective employment and a continuation of the self-correcting mechanisms already in place.

In 1982, Tennessee's Higher Education Commission received a staff report entitled A Study of Teacher Education in Tennessee (1982). One purpose of the report was to identify possible unnecessary duplication of teacher education program offerings. The report points out that in Tennessee, many persons who complete teacher education requirements are not majors in education. From 1970 to 1980 there was an overall decline of 38% in the number of persons completing teacher education requirements. However, within this period, the number of special education graduates increased by 711%.

Supply and demand data from states around the country contain similar statements about teacher shortages in math, science and special education. Regardless of region, many states are experiencing a surplus of teachers in art, health, physical education, and social studies, with others indicating a moderate surplus of elementary teachers.

States in the Southern Region are characterized by two activities not reported in other parts of the country: (a) declining numbers of certified graduates and declining enrollment due to the initiation of competency tests prior to certification, and (b) active out-of-state recruitment. Reports from Texas, North Carolina, and Louisiana referred to the state practice of hiring out-of-field teachers. This practice has evolved from efforts to compensate for teaching areas in which shortages or surpluses exist. Though mentioned only a few times in reports received, there is reason to believe that this is a much more widespread practice than previously acknowleged. The problem of hiring graduates who are not fully qualified may be acute in southern states, but surely it is not unique to those states alone.

Only in Michigan and in Minnesota were there signs of efforts to rectify teacher surpluses by curtailing production of teachers in surplus areas. In the latter case a study committee recommended against limiting enrollment in teacher education programs, while Michigan's recommendations to stop training teachers in surplus areas were not adopted. This appears to be a problem that is not being addressed vigorously by schools, colleges of departments of education (SCDEs) or other agencies with responsibility for teacher education.

CONCLUSIONS

Regardless of the methodology, the terminology, or the source, the data are unequivocal. The supply of teachers has been decreasing since the early 1970s, and all indications are that this trend will continue through the 1980s. Declining enrollment is not uniformly evident in other areas of study, as, for example, the escalating enrollment in business programs indicates. The field of education is experiencing declining enrollments because of declining student interest in a career which offers limited employment opportunities and rewards.

Decreasing availability of newly certified school personnel at a time when teacher shortages are anticipated in a few years, poses a range of problems for school districts and teacher education programs. The problems include the increased likelihood of hiring uncertified people to teach, the possibility of providing insufficient teacher education programs to assure quick certification routes to meet demand, and lowering standards to avoid losing marginal students and thus depleting the potential supply.

Because decreasing student interest in education is tied to widely proclaimed dissatisfaction of teachers as well as to the job market, major efforts will need to be made to address salary and quality problems that prevail. SCDEs will have to address this problem with school districts in order to arrive at effective long-range strategies to attract highly qualified individuals to the field and keep them there. These strategies could be coupled with alternatives to increase the supply of new teachers. Examples include (a) decreasing class size, (b) hiring more part-time teachers, (c) importing teachers from foreign countries, and (d) replacing some teaching tasks with machines.

Chapter 2

MATHEMATICS AND SCIENCE: A CASE STUDY

In announcing the likelihood of a teacher shortage in the immediate future, the following provisos must be observed:

- o differences between regions and states;
- o differences within states;
- o differences between and within subject fields;
- o differences in degree, whether stated in absolute numbers or in percentages; and,
- o some indication of the time that it takes to respond to shortages (e.g., the college graduating class of 1986 is last year's freshman class).

Mathematics and science are two subject fields which illustrate shortage areas existing in a time of overall teacher surplus. Other shortage areas include agriculture, industrial arts, some fields of special education, and some other vocational subjects. Mathematics and science illustrate differences between regions and states, differences within states, and differences in degree. In addition, science illustrates differences within subject fields. Because the shortage of mathematics and science teachers has received so much press, it can serve as a useful case study for other subject fields which are likely to undergo shortages in the next ten years.

Prior to 1980 there were few clear declarations that a severe shortage of mathematics and science teachers was upon us. The annual reports from ASCUS, NCES, and NEA provided clues that supply was lagging behind demand. This fact was also reflected in state education supply and demand reports. But there was little or no documentation of a multi-year accumulated shortage, or of the effects of the diminished teacher supply on staffing patterns in schools. Since 1980, a series of reports developed by Watson and Anderson (1980), AACTE Briefs (Do Science Teachers, 1980), the National Council of Teachers of Mathematics (1980, 1981), Olstad and Beal (1981), Howe and Gerlovich (1981), Williams (1981, 1983), and Cornett (1982) have documented the situation.

In a paper presented to the National Science Teachers Association conference, Cornett (1982) cited the following data related to teacher shortages:

- o During 1979-80, only 348 science education baccalaureate degrees were awarded in the 14 Southern Regional Education Board states. This averaged 25 per state. If two-thirds of these graduates were in biological science specialties, there were only about 8 graduates per state to cover the severe shortage areas of chemistry, earth science, and physics.

- o Texas reported 20 mathematics education graduates in 1982 with only 35% (7) of them seeking jobs in teaching.

- o Virginia Commonwealth University reported that none of its 1982 mathematics education graduates went into teaching.

- o East Carolina University reported that only four of its 17 science education graduates in 1982 went into teaching.

- o Virginia's colleges and universities graduated 240 teachers of science in 1979-80, but only 32% (76) were teaching the following year.

- o Maryland's higher education institutions graduated only 17 new mathematics teachers in 1981, and only eight took teaching jobs.

- o Florida had 708 reported vacancies in mathematics in 1980-81, but certified only 213 mathematics teachers, of whom approximately 60% were from out of state.

- o Florida had 673 reported vacancies in science in 1980-81, but certified only 258, of whom approximately 80% were from out of state.

- o In Virginia in 1980-81, 44% of the teachers of earth science were not appropriately certified.

- o In North Carolina junior high schools in 1980-81, only 52% of the teachers of science were appropriately certified.

- o In Texas in 1980-81, 283 emergency permits to teach mathematics and 219 emergency permits to teach science were issued.

A National Council of Teachers of Mathematics "Fact Sheet" (1982) included the following items:

- o Almost five times more science and mathematics teachers left teaching in 1980 for employment in nonteaching jobs than left due to retirement.

- o Although Missouri expected at least 200 vacancies for mathematics teachers in the fall of 1982, only 40 of the 80 prospective mathematics education graduates in the state were expected to teach.

- o New York state had only 32 college graduates planning to teach secondary mathematics in 1982.

- o New Hampshire had only one college graduate planning to teach mathematics in 1982.

- o In the California State University system there were only 70 students enrolled in programs for prospective mathematics teachers in the spring of 1982.

Shymansky and Aldridge (1982) asked teacher placement offices to report the number of student teachers in mathematics. In 1980 the number was only 23% of the number that had been available in 1971. The comparable figure for science was 36%. A lower percentage of those who graduated actually went into

teaching. Principals reported that of 1981-82 newly employed science and mathematics teachers, 50.2% were judged to be unqualified to teach in those fields. The percent of unqualified teachers by region is listed below:

Pacific	84%
West South Central	63%
South Atlantic	50%
East North Central	46%
West North Central	43%
Atlantic	43%
East South Central	40%
Mountain	23%
North East	9%

In testimony before the National Commission on Excellence in Education, Sara Klein (1982), President of the National Science Teachers Association, noted that the regions with the highest percentages of new unqualified teachers were those where high technology industries require the best trained science and math personnel. Anne Flowers (1982), President of AACTE, testifying before the U.S. House Committee on Education and Labor hearings on mathematics and science education, underscored the severity of the shortage and recommended solutions which have been instrumental in shaping the legislation before Congress.

The mathematics and science teacher shortage has been well documented and well publicized. What remains to be accomplished is a standardization of reporting mechanisms based upon the provisos mentioned in the introduction to this chapter.

SURVEY OF TEACHER SHORTAGES IN MATH AND SCIENCE

Reports from states seldom indicate what strategies are used to compensate for the shortages of mathematics and science teachers. Likewise, they seldom pinpoint which public school students are most likely to be assigned to out-of-field teachers or otherwise deprived of appropriate instruction. As states begin to study, adopt, and implement both short-range and long-range solutions to the shortages, SCDEs must be aware of what is possible and be actively involved in teacher recruitment and training opportunities.

In December 1982, this task force conducted a survey to gather, analyze, and report information on efforts underway in several states to alleviate the shortages. Questionnaires were sent to 721 AACTE member institutions. A response rate of 59% was distributed between 254 public and 172 private institutions. Appendix D is a copy of the survey form used. All 50 states, the District of Columbia, and Puerto Rico were represented in the respondent group.

Eighty-eight percent of the respondents indicated that there is a documented shortage of secondary mathematics teachers in their state. Of the respondents, 72% reported a documented shortage in physical and earth sciences; 57% reported a shortage in biological sciences.

The respondents appeared to have insufficient knowledge of activities of elementary and secondary teacher organizations or AACTE affiliates to deal with these shortages. There appears to be a lot of discussion on many levels about how to overcome these shortages and the resultant problems with minor action being taken by SCDEs, local school districts, and state departments of education.

Respondents were asked to rank the methods that local school districts use to combat their math and science teacher shortages. The most prevalent method is listed first:

- o Arrange for persons to get emergency/provisional certification, with state agency involvement.
- o Use other teachers out-of-field.
- o Increase class size.
- o Recruit teachers from other states.
- o Use non-certified persons.
- o Cancel courses, but usually only if 11th and 12th grade electives.
- o Cancel courses as necessary.
- o Arrange for persons to get emergency/provisional certification, without state agency involvement.
- o Provide incentives to hire the teachers they need, e.g., salary supplements, workload adjustments, etc.

As the first and second methods indicate, school districts most frequently opt to employ out-of-field teachers when faced with a teacher shortage.

POTENTIAL SOLUTIONS TO THE PROBLEM

Before commiting resources to a course of action to alleviate the shortages, it is helpful to view the problem from several angles. Then it becomes possible to focus on those solutions which are likely to bring the best results for the least cost, in a context of a high degree of political acceptance. The following considerations are suggested.

The Stages of a Teacher's Career

It has already been suggested that for many educators, classroom teaching is but the first stage in a career in education that may encompass several job changes and changes of employers. In every stage of a teacher's career, there are negative forces compelling the teacher away from the profession. The

stages and negative forces in a teacher's career include, but are not limited to, the following four.

Selection of Teaching as an Occupation.

This may occur any time between the ages of 12 and 45, although for the clear majority, 16-23 is the decision period. This suggests an opportunity for recruitment within the career decision-making process--an opportunity frequently overlooked. Page, Page, and Shelton (1982) reported that 74% of high school students surveyed reported that no one had ever talked with them about the teaching profession. Only 19% reported that a school counselor had presented teaching as a consideration for them. Career choices often change, but recruitment can continue with college students in mathematics and the sciences prior to completion of their degree.

Approach of One's First Teaching Position

Many persons completing their teaching preparation are burdened with debts. School districts need to be sensitive to this condition and find ways to get new graduates in mathematics and science education onto their payroll no later than June 1, for employment throughout the summer. This may increase the number of graduates who actually accept teaching positions. Many cannot wait until September for a first paycheck.

Decision to Return

Traditionally, a teaching career is thought of as lasting 20-30 years or more. Yet data show that most teaching careers are considerably shorter. The North Carolina Science Teacher Profile, Grades 7-12 1979-80 (1980) revealed that one-third of the first-year science teachers in North Carolina do not return for their second year, and the median years of teaching experience of North Carolina mathematics and science teachers is around nine years. Beal and Olstad (1983) report that one-third of the secondary mathematics and science teachers in the state of Washington expect to leave the field in three to five years.

In many schools, most first-year teachers have the same responsibilities and duties as veteran teachers. In addition, they are often given the least desirable courses and students. A high turnover rate might be reduced by providing a strong support system for beginning teachers to assist them in meeting the demands of a classroom and school system.

Decision to Choose Teaching as a Continuing Career

Beginning salary differences between teaching and non-teaching jobs are not so important to the eager, idealistic college senior who has planned for several years to be a teacher. But when the job has become routine, family financial obligations have increased, and the salary differential has substantially increased, then monetary incentives may be necessary to keep more mathematics and science teachers in the classroom. Kershaw & McKean (1962) presented a compelling argument in favor of salary supplements as a strategy to

combat shortages in some fields. On the other hand, many veteran teachers have accepted their salary level, but long for recognition of their efforts, a little more money for instructional materials, and administrative support on discipline matters.

If a system could be developed to identify and satisfy some teacher needs before they resign, it might be possible to retain them longer. The point here is not to suggest specific solutions, but to suggest that all teachers can not be treated in the same way and that practices that address teacher boredom, burnout, and salary frustration need to be adopted.

Targeting the Solutions

Some of the earlier citations pointed out that the shortage of mathematics and science teachers was more severe at the junior high/middle school level than at the high school level. Therefore, where this is true, proposed solutions must be directed to this level. This has implications for teacher education priorities, and for the design and content of programs through which other teachers may be retrained into mathematics or science. It suggests that junior high teachers may need breadth of content rather than depth.

A second consideration is derived from the evidence that there is little or no shortage of biological science teachers, but a severe shortage of earth and physical science teachers. Therefore, recruiting more biology teachers will not cure the shortage. Nor will incentives that could apply equally to all science teachers, regardless of their specialty. Doubling the number of new science teachers would be an inefficient use of resources; doubling the number of earth and physical science teachers would be a more efficient use of those same resources.

A third consideration is the audience to which a proposed solution is addressed. If the objective is to graduate more baccalaureates in mathematics and science education, then the audience is college students and high school students, a shrinking population. If the audience is current secondary teachers, with the objective of keeping them in the classroom, then entirely different strategies will be needed. If out-of-field teachers of mathematics and science are the audience, then a third set of strategies will be required.

Long-range and Short-range Solutions

It is frequently stated that a combination of long-range and short-range solutions will be needed to solve the mathematics and science teacher shortage. For example, the establishment of a college forgiveness-loan program to attract more undergraduates to these fields is viewed as a long-range solution. It would take three to four years for any impact at all, and there is no assurance that students would take advantage of the program, that upon completion of their college program many of them would actually enter teaching, or that those who did would stay in teaching. It is possible that such a program would make a negligible dent in a state with a shortage of 500 or more mathematics and science teachers.

On the other hand, a short-range solution by itself is also likely to be insufficient. For example, a statewide effort consisting of concurrent summer institutes may yield some quick improvements for the following year, but do nothing to alter the factors that have caused the shortage in the first place. The shortage has existed for many years and will not be overcome for many years. What is needed are sets of solutions which offer some immediate relief (1-3 years) while also overcoming the conditions that have allowed the shortages to accumulate over time (3-10 year and longer solutions).

Politics: The Art of the Possible

Whatever solutions are proposed, and whether the decisions are to be made within an institution of higher education, by a local board of education, or by a state or federal legislature, they will be made in a political context. These three criteria will be applied: perceived effect on solving the problem, perceived cost, and perceived political acceptability. Although it is often stated that salaries of mathematics and science teachers need to be competitive with salaries in industry, no state legislature has introduced a bill to accomplish this because the concept fails the criteria of perceived cost and political acceptability. Yet some less severe salary differences have been adopted in Houston, Texas; Richmond, Virginia; and Oklahoma City, and have been endorsed by the State Board of Education in North Carolina and tied to extended terms of employment for mathematics and science teachers.

OPPORTUNITIES FOR TEACHER EDUCATION INSTITUTIONS AND TEACHER EDUCATORS

Those in teacher education who wish to contribute to the solution of the mathematics and science teacher shortage can do so as an interested individual, under the aegis of the SCDE, or through their state affiliate of AACTE. The individual has many mechanisms to work through as members of professional organizations, as consultants to interested groups, or as contributors to publications.

In conjunction with the SCDE, teacher educators can get involved in student recruitment, program development, coaliton-building with other units on campus, extension activities to classroom teachers and school districts. In conjunction with a state AACTE affiliate, an ad hoc committee could develop a strategy which would result in assigning specific teacher training programs to institutions so that each could do what it can do best, and so that they would be contributing to the solution in a cooperative way rather than in a competitive way such as trying to recruit the same limited pool of students. The implementers in each SCDE could form a support group to share successes and failures.

Regardless of how individuals choose to be involved, there are four categories of activity to absorb interest and efforts: information collection, analysis, and dissemination; research; program offerings; and policy analysis and influence.

Information Collection, Analysis, and Dissemination

This is a fertile opportunity for teacher educators who need not be specialists in mathematic or science education. First, there is the opportunity to replicate for the individual's state some of the reports already conducted in other states. Such reports could focus on SCDE production trends, teaching assignments, students affected or all of these. Regardless of the focus, the limitations listed earlier can be applied, and thereby improve the quality and usefulness of new reports. Such data can be used to inform officials at the local and state levels of actual conditions and the degree to which a problem has progressed. The data can also be used to refute myths and misinformation, such as the prevailing belief that mathematics and science teachers are moving to industry. At such time that proposed solutions appear to be discriminating in favor of one group of teachers, the data can be a useful rationale for the need for action.

The data can be disseminated in several formats: journal articles, study committee or commission reports, news releases, letters to influential individuals, presentations at professional meetings, etc. The key here is the purpose for the report. If the author is trying to raise the public consciousness or influence pending legislation, then a journal article would usually be inappropriate.

A conduit for exchange of existing information is also important. This can occur within a state, between states, and with offices in Washington, D.C. This may involve repackaging existing data and reports, or combining information from several sources into a more effective document. One focus here could be on the collection of information regarding solutions which have been implemented elsewhere, and their effects.

Research

Although conventional wisdom would seem to indicate that students are likely to learn more from appropriately certified teachers than from out-of-field teachers, this theory needs to be tested. It may be that a combination of teacher competencies which does not include appropriate certification in mathematics and/or science is sufficient to obtain the desired student achievement at some levels, and/or at least with some types of students.

If a state certifies secondary mathematics and/or science teachers only in a span covering all secondary grades, that state may be overtraining in content those teachers who would prefer to teach at the junior high/middle school level, and discouraging others who would not want to tackle the advanced courses. Futhermore, such teachers are better candidates for nonteaching positions than teachers with breadth instead of depth. Given the grade structure and teaching assignments in today's junior high/middle schools, modifications to a teacher education program to make the new teacher's preparation more relevant to his/her assignment need to be explored. The question becomes "if breadth replaced depth, would more people be attracted to the teacher education programs in mathematics and science than are now attracted to the traditional programs?"

It has been hypothesized that negative experiences in mathematics and science in elementary and junior high/middle grades are a causal factor of negative student attitudes towards these subjects (and avoidance of them) by many students at the secondary level. The extent to which this is true, and the extent to which out-of-field teachers directly and/or indirectly contribute to these attitudes also needs to be investigated.

Relationships between certification, qualifications, and effective teaching need to be carefully studied.

Program Offerings

The last section referred to changes needed in the preparation of secondary teachers. A similar effort is needed for elementary preparation programs. For example, why is it that the general education component of many elementary teacher preparation programs includes about 30 hours in langauage arts and social studies content compared to only 12-16 hours in mathematics and science content?

Some institutions may be in a position to develop cooperative relationships with institutions which would allow their students to develop a specialty in earth or physical science. For instance, a college without sufficient course offerings in those fields could cooperate with another institution in order to bring in instructors in astronomy, geology, marine science, or physical science for one course in each subject each year. Or, students could enroll full-time for one semester in the institution which regularly offers such courses and take only those courses not offered on their home campus.

Other institutions could develop a middle school earth or physical science track with perhaps no additional education faculty by drawing upon the natural sciences departments on their own campus.

In one state an examination of college catalogues revealed that several institutions which offered science education certification programs did not have them listed in the catalogue, or had them listed in an obscure way. Even though the programs were available, potential students could not easily know this.

Many other colleges have active programs in mathematics and/or science education, but have extremely low enrollments. Sometimes this results in high cost-per-student figures; other times it results in general methods course instead of specialty methods courses. Where such colleges do not have an active recruitment program focused on these curricula, they may be missing a market of potential students which could both strengthen the program and help to alleviate the mathematics/science teacher shortage. Institutions undergoing enrollment declines may stimulate enrollment by offering and advertising programs which are visibly geared to teacher shortage fields.

Recruitment efforts should be directed to a broader audience than high school students. Other target groups should include junior high/middle school students, undergraduates not in teacher education programs, graduates in mathematics and/or science who later become interested in completing teacher

certification requirements, and persons with other teaching certificates who wish to add a mathematics or science certificate or endorsement.

Specialized programs should be offered in order to meet the certification needs of employed teachers. Some of those who are teaching mathematics and science out-of-field will be interested in late afternoon, Saturday, and summer courses which will lead to appropriate certification. The current achievement level of some will require undergraduate, and even high school, mathematics/science courses, whereas others may need graduate courses. SCDEs will need to be cautious regarding the granting of graduate credit and responding to requests to participate in "quick-fix" certification programs proposed by others. Efforts to restrict out-of-field teaching, plus reductions-in-force, will stimulate requests by, and on behalf of, current teachers. Quality must not be sacrificed for expediency.

Policy Analysis and Influence

Teacher educators also can fill one or more of the following roles: initiator, clarifier, consultant, or advocate. One useful activity would be to develop the issues. For example, some people confuse salary supplements in fields of shortage with merit pay plans. Others will resist any effort to break the single-salary schedule, without realizing that there is no single-salary schedule, it already has two variables and several categories of exceptions. They will also interpret extra pay for extra work as merit pay, which it is not.

Another opportunity is to provide leadership for the development of a list of possible solutions to the shortage with attention given to eliminating less effective solutions. The three criteria mentioned earlier (perceived relief, perceived cost, and perceived political acceptability) are useful here. In North Carolina such an initial list contained 53 items; the revised list had 27 items. These were field-tested with some 2,200 subjects ranging from teacher education seniors up through local board of education members. The three items rated as preferred were: (a) providing a better climate for teaching in classrooms and throughout the school; (b) assuring that mathematics and physical science teachers are allotted sufficient equipment and instructional materials funds annually; and (c) providing scholarships for teachers of physical science and mathematics who desire to attend college/university courses in order to upgrade their teaching. This information was useful in arriving at recommendations which would be expected to have the most support from the field.

The 27 items in the North Carolina project were arranged to match the stages of a teacher's career. This helped the planners focus on a strategy to increase undergraduate enrollment in mathematics and science education; a strategy to increase the percent of graduates who go into teaching; a strategy to increase the percent of first-year teachers who return for a second year; and so forth. The perceived advantages and disadvantages of each proposed strategy were debated. Each strategy was examined for the decision-making structure required to be introduced and advocated.

Teacher educators who elect to involve themselves in these matters might invite colleagues from economics, public administration, sociology, and organizational theory to critique ideas and offer their perspective on strategies and solutions. Colleagues in the physical sciences can also be helpful, as well as representatives from industries which hire teacher education graduates.

Authenticity and trust are two attributes essential to successful change agentry. Advocates for change are more likely to project these attributes if they focus on the ultimate benefactors of the proposed changes: the students. If teachers or SCDEs also benefit, that's an added advantage. In this context, extended employment or salary supplements for mathematics teachers are not proposed as teacher benefits, but rather, as strategies which will result in appropriately certified teachers. Similarly, proposals for SCDEs to conduct training programs for mathematics and science teachers must result in improved classroom instruction by those teachers, and not be just another attempt to generate enrollment. Authenticity and trust in these matters can help enhance the image of teacher education.

Teacher educators are encouraged to establish a support group of interested persons outside of their institution. It may include those in other SCDEs, employees in state agencies, legislators, or other interested individuals.

Teacher educators who choose to work through their AACTE state affiliate may be able to establish cooperative agreements between SCDEs. They may work out a scheme whereby the group sets some targets for enrollment and production to overcome the shortages.

IMPLICATIONS FOR OTHER SUBJECT FIELDS

If the projections into the next decade which are cited in Chapter 1 and other reports are accurate, elementary education will be facing an immediate teacher shortage, and most secondary fields will be facing a shortage in the early 1990s. The mathematics and science shortages have provided valuable lessons which should assist teacher educators in preparing for projected shortages in other fields and levels and take steps to forestall shortages.

A first step is the establishment of a data base. The data base can be used to monitor the development of a shortage, to document the shortage quantitatively, and to provide the rationale for the need to take action. Trend lines which can be discerned from the data base will be helpful in predicting the future, as well as providing planning time to develop and implement solutions.

Consciousness-raising is also necessary. The geographic scope of the individual's concern (e.g., local, state, national) and the decision-makers who are targeted as needing to make changes affect the strategies and degree of consciousness-raising activity. In the case of the mathematics and science teacher shortage, this was accomplished in just two years through the active involvement of many groups. It would be preferable that consciousness-raising be done before the shortages become too severe.

A constituency of interested advocates should be developed. An exhaustive list of possible short-range and long-range solutions should be developed as well. These solutions can then undergo discussion and field testing. Where possible, change should be instituted before the shortages actually occur, or while they are minimal.

Chapter 3

QUALITY ISSUES IN TEACHER EDUCATION

The analysis of reports on teacher supply and demand raises serious questions concerning the quality of teaching in our nation's schools, both in the immediate future and throughout this decade. Unless interventions are made, it appears that the supply of certified teachers will continue to decrease at a time when demand for teachers will increase. It also appears that, without interventions, this condition, while applicable to education in general, is presently, and will be increasingly, more severe for selected subject areas and geographic regions.

In addition to issues of teacher shortage and surplus, the task force was charged with the study of quality issues related to teacher education. Obviously, Chapters I and II raised issues of quality based on review of the literature on supply and demand of teachers and the specifics of the mathematics/science teacher shortage. A second review of selected reports on teacher quality was undertaken to complement the preceding chapters. This review of quality issues in teacher education utilized the most current reports on topics ranging from school and teacher effectiveness to teacher competency assessment. The intent was to identify quality issues and actions, or recommendations for action, which would impact the quality of teaching and teacher education; it was not the intention of the task force to define quality in teacher education.

To more specifically address the issues of quality teacher education, a survey was conducted to study the action being taken by SCDEs in meeting the increased demand for higher quality teacher education graduates. This survey was perceived by task force members as a preliminary study to investigate the degree to which SCDEs were planning for and implementing changes to increase the quality of their graduates. The study also addressed questions about the influence of teacher certification changes which have occurred in many states and their effect on teacher education.

The first section of this chapter contains the review of selected reports on quality issues, followed by a second section reporting the results of the survey of recent changes in teacher education practices. Each of these two sections was prepared to stand alone as a separate effort in the study of quality issues even though the two were conducted simultaneously.

A REVIEW OF RECENT LITERATURE RELATED TO QUALITY IN TEACHER EDUCATION

1983 has been called the year of the study of education because of the number of reports which have been or will be issued examining the quality of teaching and our nation's schools. Chief among these is the report of the National Commission on Excellence in Education, A Nation at Risk: The Imperative for Educational Reform (1983). The report includes a number of recommendations which address curricula, standards and expectations, length of

the school day and year, teacher preparation, conditions for employment, and leadership and fiscal support for schools.

Specific reference is made to the issue of quality in teacher preparation and to the fact that

> Persons preparing to teach should be required to meet high educational standards, to demonstrate an aptitude for teaching, and to demonstrate competence in an academic discipline. College and universities offering teacher preparation programs should be judged by how well their graduates meet these criteria. (National Commission, 1983, p. 30).

Another recommendation suggests potential solutions to help solve the immediate shortage of mathematics and science teachers. The solutions set forth include recruiting recent mathematics and science graduates and retired industrialists and scientists and then retraining them as teachers.

Since the issuance of the National Commission's report in April 1983, other reports, which also focus on the quality of instruction in elementary and secondary schools and on student achievement, have been issued by the College Board (1983), the Twentieth Century Fund (1983), the Education Commission of the States (1983), and the Business-Higher Education Forum (1983).

The American Teacher (Feistritzer, 1983) could be viewed as a companion document to this task force report since it analyzes and describes many of the issues treated herein: supply and demand, especially in mathematics and science; current practices in the profession related to salaries and expectations; and, the academic caliber of students entering teacher education programs. The study concludes that indeed:

> There is a serious crisis in teaching in the United States. It jeopardizes this nation's ability to conduct its own public affairs through the workings of an informed electorate. It endangers the nation's capacity to compete effectively in a shrinking world where technological skill and inventiveness will determine leadership. (Feistritzer, p. 59).

Eight conclusions follow this indictment of the profession, but the study offers little in the way of solutions to the problems cited.

Ann Flowers, (1983) addressing the National Institute of Education Conference, "Teacher Shortage in Science and Mathematics: Myths, Realities and Research," sought to dispel the following myths regarding teacher education programs:

- o The schools are failing.
- o There are too many teachers.
- o Certification waivers will bring good teachers into the classroom.
- o If we pay enough, we will get the teachers.

- o Teaching is just a matter of common sense.
- o Teacher Education students are not very smart.
- o Teacher Education students spend all their time in professional education courses.
- o A single solution is the answer.

Noting that, "in each myth, there is some reality and in each reality, there is some myth," Flowers refuted each myth and cautioned against accepting easy solutions to problems related to shortages or issues of quality in teacher preparation programs without giving full consideration to possible implications.

The Condition of Education (NCES, 1983) highlighted significant improvements in teacher preparation programs during the period 1977-1982. It indicated that SCDEs were taking steps to strengthen the teacher education curriculum. Eighty-five percent of the respondents to the NCES survey indicated that their curriculum was now more challenging; 74% indicated that they had raised requirements for admission to teacher education programs; and 6% indicated that the undergraduate teacher training program had been lengthened beyond the traditional four years. Nearly 88% of all beginning, full-time certified teachers indicated that their college studies were closely related to their work, dispeling a generally accepted myth that teacher training is not relevant to the world of work.

This renewed emphasis on the study of education and teacher preparation focuses attention and energy on the problems and possible solutions. From the perspective of teacher education, the reports issued must be viewed as a critique of the way in which teachers are prepared. They also should provide a stimulus for an evaluation of the quality of teacher education programs.

Prior to 1983, a number of other studies addressed the issue of quality in teacher preparation. They emanated from a broad range of individuals, groups, and associations.

In a study funded by the National Institute of Education, Vance and Schlechty (1981) remind us that, "negative assessments of the qualities and characteristics of school teachers is not a new phenomenon in America." They tested four theories which relate to the issue of quality:

- o Differences exist between teacher education graduates and other graduates, including academic ability.
- o Differences exist between those who are eligible to teach and those who actually teach.
- o Differences exist between those who teach and leave teaching and those who teach and plan to continue teaching.
- o There is a cumulative effect of these differences on those who remain in the teaching profession.

The researchers' conclusions suggest that those who enter teacher education programs are less academically able than those who enter other college programs. They also suggest that those who choose to remain in the profession are among the least academically able.

The report of the Southern Regional Education Board Task Force on Higher Education and the Schools, The Need for Quality (1981), stated that:

> Improvements in the teaching profession will depend not only on tougher and better preparation of teachers, but on public respect and financial rewards for teachers. (SREB, 1981, p. 2).

Higher standards for teacher education programs, tighter certification requirements, teaching internships, on-the-job assessment, and better management are within the overall plan developed by the SREB task force.

In a progress report, Meeting the Need for Quality: Action in the South (SREB, 1983), the SREB task force summarized conclusions based upon responses from 14 Southern states to the program for educational improvement developed in its 1981 report. Those conclusions related to improving the quality of teachers include the following:

- o In the 60s, one out of six college freshmen was planning to be a teacher; now, only one in 20 makes this choice, and those who do tend to rank lower in test scores than do other majors.
- o Attracting better quality teachers is tied closely to salary levels.
- o Minimum competency teacher certification tests result in substantially higher failure rates for blacks than for whites.
- o Weaknesses in quality center in the general education portion of the total college program.
- o The university reward structure strongly encourages research to a degree that often inhibits colleges of education from greater involvement with schools.
- o Certification rules are still too complex and too rigid.
- o Little attention has been given to accommodating arts and science graduates with provisional certification.
- o Common teacher certification tests would facilitate migration of teachers.
- o Improving continuing education of teachers is crucial because of relatively low turnover rates and, consequently, small numbers of beginning teachers.
- o Graduate courses should be relevant to teaching assignments. (SREB, 1983).

The task force's recommendations for action include the following:

1. SREB should continue to foster and monitor changes in admissions standards for teacher education programs and results on teacher certification tests, with special concern for assuring an adequate supply of black teachers.

2. Financial incentives should be established to reward outstanding teachers and to facilitate recruitment and retention of highly talented and motivated individuals. A renewed focus on excellent teaching will help to restore the honor of the profession--an important intangible reward that has eroded in recent years.

3. States should provide loan-scholarships to attract academically superior college students into teaching, with special attention to the recruitment of minority students.

4. College presidents should provide leadership, including the coordination of efforts by faculties in the arts and sciences and in education, to improve teacher education programs. To assure a strong foundation for professional preparation, institutions, including community colleges, should closely examine the content of the general education courses education majors take.

5. College campuses should create incentives for closer faculty involvement in the affairs of the schools.

6. As a step toward simplifying the complexity of certification, states should reduce the variety of subjects for which they issue certificates, based on a review of the curriculum in the schools, including the extent to which specialists in various subfields are assigned in-field and out-of-field positions.

7. States should move to a common teacher certification test. Those that use a different test should develop crosswalks with the common test to facilitate the interstate movement of teachers who have already taken the common test.

8. Institutions should insure that admissions requirements into graduate programs in education match their standards for other advanced degrees.

9. States should require that graduate courses taken by teachers for recertification are relevant to their teaching assignments. (SREB, 1983).

Position Papers Developed by AACTE

In 1976, AACTE published the seminal document Educating a Profession (Howsam, Corrigan, Denemark, & Nash). This work, which will be reissued in 1984, presented recommendations for change in American teacher preparation programs and became the basis for future Association position papers. Educating a Profession: Profile of a Beginning Teacher (1983), the first of a series of statements discusses the knowledge base necessary for a quality teacher education program. Specifically, it proposes that there should be more emphasis on the general education aspects of the program, the knowledge base of the field of pedagogy, the content of the subject field, and, more importantly, additional attention to the study and practice of teaching as a discipline for analysis and evaluation. The report challenges the profession "to critically examine the general education, preprofessional studies, academic specialization, and professional studies to determine if the needs of prospective teachers are being met" (AACTE, 1983, p. 14). It also urges all constituents of the profession to try to achieve consensus on these issues and subsequently to revise preparation programs as a cooperative effort.

AACTE's statement Educating a Profession: Extended Programs for Teacher Education (1983) discusses the time needed to develop the knowledge, skills, and experiences outlined in Profile of a Beginning Teacher. The report discusses proposed changes in teacher education, provides examples of extended programs, and makes recommendations for implementing such a program. Problems associated with implementation of an extended program, such as low esteem and low compensation, are considered. However, the emphasis is on the goals of the program to insure that quality is achieved. The report strongly urges the establishment of extended professional preparation programs in order to encompass the ever-expanding knowledge base in education.

A position paper prepared by the AACTE Task Force on Teacher Competency Assessment (1983) urges institutions to recruit quality students to teacher education, and, at the same time, improve their preparation programs. It is the position of the Association that competency assessment is a vital and essential part of the effort to strengthen teacher education programs. The profession is obligated to establish entry criteria and to determine that persons admitted have met established standards. The decline in the quality of teachers has been accelerated by the decline in academically talented students selecting teacher education, poor salaries, and the decline in public esteem.

In evaluating what should be assessed in competency testing, the task force recommends that criteria related to skills and attitudes outlined in Profile of a Beginning Teacher be used and that assessment should encompass the cognitive, affective and psychomotor domains. Instruments, criteria, and norms are to be shared by all professionals involved. Where states are mandating competency assessment, member institutions are asked to take a leadership role in the creation and implementation of such plans.

Reports on the Professionalization of Teacher Education

The Ford Foundation Report, State of Teacher Education (1982), summarized recent research on such elements as the institution, faculty, students, job placement, program realignment, resources, national accreditation, certification and evaluation, and inservice professional development. The following recommendations for action were made: (a) a reduction in the number of teacher education programs; (b) an examination of professional school models; (c) the recruitment and retention of high quality faculty and students; (d) the development of ways to address shortages in certain fields; (e) the implementation of a structure to build vigorous and realistic programs, using knowledge about bilingual, multicultural and global awareness; (f) consideration of various structural reforms including extended programs, and early clinical experience with integration of theory and practice; (g) an examination of the possibility of a national curriculum in teacher education; (h) the development of technological literacy; and (i) interventions and incentives.

The National Education Association report, Excellence in Our Schools, Teacher Education: An Action Plan, (1982), identified the knowledge and skills needed by beginning teachers to work effectively in the classroom. The document maintained that one essential factor, the expertise of the practicing teacher, often had been missing from the decision making-process. The three major functions of teaching are identified as: (a) facilitating learning; (b) managing the classroom; and, (c) making decisions.

Robert B. Howsam in "The Future of Teacher Education" (1982) and Stephen S. Weiner in "A New Look at Policies to Strengthen the Teaching Profession" (1982) examined the environments in which teachers work. They pondered the question, "Do we really want to recruit the talented, able student for these situations?"

Howsam characterized three environments in which teachers either do or, in the future, will function: professional perspective, work-force perspective, and state-monopoly perspective. The professional perspective was envisioned as a five-year program which would enable teachers to become responsible for curriculum planning and management of the instructional environment. They would be treated as professionals and would exercise control over the entire learning environment.

In the work-force environment, teachers would belong to a professional organization that serves as their collective bargaining agent. Knowledge and skills derived from classroom experience would be favored over that derived from scholarship and research. The preparation of teachers would move to teacher centers, led by practioners and supervised by master teachers. Inservice education would be emphasized.

The state-monopoly model, in contrast, would place the states in control of everything: ends, means, and market. Howsam expressed his belief that one of these three models existed in every learning environment and that as a result of its existence educational leaders should focus attention on the rethinking of education in general.

Weiner stated that colleges of education will not make a great difference in the quality of teaching. He noted that tinkering with programs and raising requirements will have a marginal impact at best. Screening out unqualified candidates would be of little value if nothing were done to make teaching attractive to qualified candidates. Weiner mentioned a 1980 survey which reported that four out of ten teachers expressed regrets over having become a teacher and national statistics which suggest that education students are drawn from the bottom one-third of entering college freshmen.

> Let's face it, teaching has never attracted a significant number of quality talented, and educated people. The profession has had better teachers than was deserved for most of its history because the poor and minority male saw teaching as a status symbol and even more importantly, women were limited to teaching, nursing, and social work. Today, qualified women and minorities are recruited to a wide range of fields.
>
> Do we really want a strong teaching profession? Will the talented, intelligent, self-confident people we need in the classroom permit school boards and administrators to treat them arbitrarily? Will they allow schools to dictate curriculum? Do we really want talented people as teachers, or would we prefer pedestrian and unimaginative instructors in the classroom who can take orders and, in turn, make sure that our children tow the line? Are we prepared to accord school teachers a strong measure of professional discretion to shape curriculum and help set policy for our schools? (Weiner, 1982, p. 6)

Weiner's solutions included raising salaries, recruiting talented students and funding one or two year sabbaticals after ten years of teaching.

Reports on the Competency Assessment Issue

Nearly all of the recommendations for quality in education have included a competency approach to the selection and credentialing of teachers. Recent events affecting the status of competency testing were summarized in Teacher Competency Assessment: A National Perspective (Sandefur, 1982). Twenty-seven states have legislative or state department of education mandates to develop state-wide competency tests for teachers. The majority of these programs are in the south and west. Nine additional states were identified as being in a planning phase for competency testing. Thirty-six states were engaged to some degree in testing the competency of teachers. Of those, twenty-one assessed applicants for admission and twenty-eight planned to test prior to certification. Tests for certification usually included basic, professional, and academic skills. Seventeen states were using national tests, while sixteen states were in the process of developing their own tests. A number of states were assessing, or planning to assess, on-the-job performance. An analysis of Sandefur's charts and detailed description of the levels of sophistication of competency testing confirmed that the concept has been readily adopted. Most SCDEs are now struggling with the realities of implementation at both entrance to and exit from teacher education programs.

Throughout the literature the need for a single agency for accreditation or licensure was identified. Many of the authors automatically gave that responsibility to state departments of education; however, a number of them made a plea for the strengthening of the National Accreditation of Teacher Education (NCATE). Accreditation was identified as intended to accomplish two basic objectives: (a) assure society that those permitted to practice are competent, and, (b) protect qualified practitioners from competition from unqualified individuals. Watts (1982) recommended a mandatory system, possibly NCATE. Mertens and Yarger (1982) believed NCATE should be modified so that institutions failing to meet NCATE standards would be denied the opportunity to prepare students. Weible and Dumas (1982) agreed with Mertens and Yarger that standards existed but had not been enforced. Not only does this confusion exist in the accreditation of programs of preparation, but even more so in the certification and recertification of teachers. Rowls and Hanes (1982) reported that quality control through institutions of higher education has played the major role in the certification of teachers and many states allow individual districts to control recertification.

Summary

The topic of quality in teacher education has been widely discussed in the literature. Although a wide range of recommendations were advanced to ensure quality, many of them included the administration of competency tests and the use of accreditation systems. Specific methods were recommended for recruiting talented students and for monitoring their preparation. Other suggestions dealt with the need for improved financial resources for teaching and for an improved image for the profession.

AACTE and its member institutions must continue to monitor proposals for increased quality in teacher education and provide leadership in the implementation of these proposals. Recommendations for action are contained in Chapter IV of this report.

SURVEY OF RECENT CHANGES IN TEACHER EDUCATION PRACTICE

In 1982, the Task Force on Shortage/Surplus/Quality Issues in Teacher Education conducted a survey of member institutions to determine those areas of teacher education where changes are being made to improve the quality of teacher education graduates. This survey was viewed as a first step toward identifying actions being taken by SCDEs to meet the demand for an increase in the quality of new teachers.

Items were identified in three categories that appeared to be relevant to quality in teacher education: (a) quality control measures related to the student in teacher education program, (b) components of the teacher education program, and (c) areas of support for teacher education programs (to include administration and organization). In all three categories an "other" item was available for areas not included in the list. Respondents were asked to respond to items for both elementary and secondary teacher education.

In addition to the responses to items relating to teacher education, respondents were asked to respond to items relating to state teacher certification policies and practices. These items were included to determine whether changes in teacher certification were perceived as a positive influence on the quality of teacher education graduates and whether these changes were influencing teacher education programs. Respondents also were asked their perceptions of selected organization and group influence on changes in teacher certification standards. Demographic data included support status (public or private) and the estimated number of graduates from their teacher education programs for the 1981-82 year. The questionnaire appeared in the April 1982, issue of the AACTE Briefs and a response from slightly less than 10 percent of the AACTE member institutions was received by June 1, 1982. Task force members then revised the questionnaire to include some measure of the respondents' item value, and directly mailed the questionnaire to a sample of institutions.

In the revised questionnaire, items for each category were to be ranked by respondents regarding the perceived importance for affecting the quality of teacher education in their institution (Appendix F contains a copy of the questionnaire).

The change items on the questionnaire were grouped into three categories: (a) quality of student, (b) quality of program and (c) support of program. Respondents were asked to rank the items within categories and to indicate the status of change occurring for each item at their institution. Thus, data were obtained in terms of the relative importance of the items and the stage of change of the items.

In addition to the change items, respondents were asked to complete items regarding the status of teacher certification changes. The analysis of responses to the change items and teacher certification items form the basis of the analysis of the data which is contained in Appendix E.

The analysis of data obtained from the survey were primarily in two sets. The first was a summary analysis of total group responses across all items on the questionnaire. This set of analyses provided an overview of comparisons of responses across the demographic variables of number of graduates, funding status, and status of state mandated teacher competency testing for certification. Each of these sets of analyses is discussed in Appendix E.

It was decided that selection of institutions by state would be most useful since questions on state certification were included in the questionnaire and that a random selection would not be as useful as a purposeful selection taking into account size of state and geographic zone. Thus, institutions in 16 states were selected for the survey. Of the 296 questionnaires sent, 239 were received for a return rate of 80.74%. Table 10 shows the responses by state.

It should be emphasized that the sample of institutions may not represent the population of AACTE member institutions. However, the data obtained from the sample institutions would be reasonably representative of the 16 states chosen and do provide useful information regarding change trends and activity within teacher education institutions in these particular states. The percent of public and private supported institutions in the sample population accurately represented AACTE's membership with 46.98% private and 53.02% public.

Table 10

Responses by State to the AACTE Survey on Recent Changes in Teacher Education Practices

State	Number Sent	Number Received	Percent of Total Responses
*Florida	13	11	4.6
Iowa	23	12	5.0
*Kentucky	14	14	5.9
Maine	3	2	0.8
Michigan	19	17	7.1
*Mississippi	9	7	2.9
*Missouri	26	21	8.8
Nebraska	14	12	5.0
*New Mexico	3	2	0.8
New York	33	22	9.2
*North Carolina	21	19	7.9
Ohio	34	30	12.6
*Texas	50	42	17.6
Utah	5	5	2.1
Washington	12	8	3.3
*West Viginia	17	15	6.3
TOTALS	296	239	99.9

*Indicates those states with mandated state teacher competency testing as a prerequisite for certification.

Summary of Findings

Findings from the total group summary included the following:

- o Test of basic skills at entry into teacher education appears to be the most highly regarded area for improving the quality of students while affective or attitudinal measures were perceived as least important.
- o Teacher education course content was viewed as the most important area influencing the quality of the graduate. Also field experience and program organization and evaluation were ranked highly as areas affecting the quality of the teacher education graduate.
- o The program support area perceived to be most important in affecting the quality of the graduate was faculty/staff development. Coordination with field based educators was also regarded as important to producing quality graduates.

- o Tests of basic skills at entry into teacher education and exit standards were the two areas where change or planning for change was reported.

- o The two areas under Quality of Program where the most reported change was occurring were teacher education course content and program evaluation.

- o Three of the seven areas under the category Support of Program had high frequencies of reported change. They were faculty/staff development, coordination with academic disciplines, and coordination with field based educators.

- o Recent change in state teacher certification standards was perceived by most respondents, with the majority reporting that these changes positively affected their teacher education programs.

- o The State Departments of Education were perceived as most influential in changing the teacher certification standards. Legislators and teacher educators (second and third, respectively) were viewed as the next most influential.

Size of Teacher Education Program

While the above differences were found across groups classified according to number of graduates, the consistency of responses were probably more noteworthy indicating that size of program is not highly related to perceived value of the areas under Quality of Student, Quality of Program, or Support of Program.

While the total group analyses revealed that affective or attitudinal measures were viewed as less important than other areas under the category Quality of Student, respondents from institutions with small programs (with 0-50 graduates anually) perceived this area as more important than did other respondents.

Pre-student teaching experience was perceived as somewhat less important by respondents from moderately large institutions (301-499 graduates annually) while they viewed internship or fifth year programs as more important than their colleagues in the other groups.

Research in teacher education was valued more by respondents from institutions with more graduates than by respondents from smaller institutions.

In the following areas, more reported change and planning for change is occurring in larger institutions than in smaller institutions: entry requirements, field based education (both inservice and preservice), faculty/staff development, research and administrative reorganization.

Public and Private Institutions

Respondents from private institutions perceived affective or attitude measures for entry requirements, preservice field experience, faculty and administrator relations and coordination with other disciplines as more important than did respondents from public institutions. Research in teacher education was perceived as more important by respondents from public institutions than by their peers in private institutions. In the following areas, public institutions reported more change and planning for change than did private institutions: entry and exit requirements, program and administrative reorganization, inservice teacher education, faculty/staff development, coordination with field based educators and research in teacher education.

Mandated State Competency Assessment

The respondents from institutions in states mandating competency testing for teacher certification (with-mandate group) placed more importance on entry tests of basic skills, and increased hours and increased financial resources for teacher education than did respondents from institutions in states not mandating competency testing (without-mandate group).

The without-mandate group viewed field experiences prior to student teaching and coordination with field based educators as more important than did the with-mandate group. The with-mandate group generally reported more change occurring in entry and exit requirements with the exception of GPA. Planning for entry requirement of a higher GPA was reported more often in the without-mandate group.

Generally, the with-mandate groups indicated more frequent planning for change while the without-mandate group more often reported change actually occurred in the areas of program reorganization, student teaching supervision, program evaluation, and coordination with academic disciplines. The with-mandate group reported fewer increases in financial support than did the without-mandate group. By a small margin, more with-mandate groups planned for increased financial support.

Chapter 4

CONCLUSIONS AND RECOMMENDATIONS BASED ON THE RELATIONSHIP BETWEEN SHORTAGE/SURPLUS/QUALITY ISSUES AND CHANGE OCCURRING IN TEACHER EDUCATION INSTITUTIONS

There is growing awareness among educators that teacher preparation programs and the teaching profession in general are affected in complex ways by changing patterns of teacher supply and demand. These variables affect the relationships between the job market and enrollment in teacher education programs, and between employment practices and quality instruction.

Teacher education institutions are only one of many groups which influence the direction and quality of K-12 schools. The organized teaching profession, state and national school boards associations, state and national school administrator organizations, curriculum organizations, parent-teacher associations, state departments of education, state legislatures, state and local boards of education, community pressure groups, federal policies and regulations, and the American taxpayers all contribute to the level of quality in our elementary and secondary schools. Nonetheless, teacher education institutions, as a unit, should be a leading force in addressing quality in our nation's schools.

The report of AACTE's Task Force on Shortage/Surplus/Quality Issues analyzes the relationship between teacher supply and demand and quality issues in teacher education. It also provides a synthesis of changes that are occurring in teacher education institutions. This article summarizes the task force report and makes specific recommendations for action by AACTE and schools, colleges, and departments of education.

SUPPLY AND DEMAND ISSUES

The first chapter of the task force report reviews the supply/demand literature and presents an analysis of the national, regional, and selected state-by-state data. Based on this data, several conclusions were reached.

First, regardless of the methodology, the terminology, or the source, the data are unequivocal--the supply of graduates who major in education has been decreasing since the early 1970s, and all indications are that this trend will continue through the 1980s. Enrollment in education programs is declining, but this is not uniformly experienced in other areas of study. In business programs, for example, enrollment has escalated. The field of education is experiencing declining enrollments because of declining student interest in a career which offers limited employment opportunities and rewards.

Decreasing availability of newly certified school personnel at a time when teacher shortages are anticipated within the decade poses a range of problems for school districts and teacher education programs. The problems include (1) the increased likelihood of hiring uncertified persons to teach, (2) the

possibility of providing inadequate teacher education programs to assure quick certification routes to meet demand, and (3) the lowering of standards to avoid losing marginal students and thus depleting the potential supply.

Because decreasing student interest in education is tied to widely proclaimed dissatisfaction of teachers as well as to the job market, major efforts will need to be made to address salary and quality problems that prevail. Teacher education institutions will have to address this problem with school districts in order to arrive at effective long-range strategies to attract and retain highly qualified individuals to the field. These strategies could be coupled with alternatives to increase the supply of new teachers. For example, the number of students per class could be reduced; more part-time teachers could be hired; teachers from foreign countries could be imported; and teaching tasks could be replaced with machines.

Few states appear to have mechanisms for ongoing collection and dissemination of information about teacher surplus and shortage. Information received by the task force about states was the result of data collected by state departments of education, special interest groups, or individual researchers associated with a college or university.

Data on shortages in the areas of mathematics and science were collected in 1982 through a task force survey to 721 AACTE member institutions. The purpose of this study was to gather, analyze and report efforts underway to alleviate shortages in the teaching fields of mathematics and science. The data from the 426 responding institutions yielded the following information:

- o A majority of the respondents, representing 254 public and 172 private institutions, 49 states, the District of Columbia and Puerto Rico, indicated that a shortage of secondary teachers in the areas of mathematics, physical and earth sciences, and biological sciences exists in their respective states.

- o The shortage is considerably greater in the physical and earth sciences than in the biological sciences.

- o The demand for mathematics and science teachers is significantly greater than for other teachers.

- o Decreases in enrollment in mathematics and science education are greater than those in other fields.

- o No special arrangements to recruit and retain secondary majors in the areas of mathematics and science were reported.

- o The most prevalent devices used by local school districts to combat mathematics and science teacher shortages were (1) arranging for persons to get emergency/provisional certification with state agency involvement; (2) using certified teachers with other academic specializations; and (3) increasing class size.

- o High school students who could be characterized as high achievers appear to be at the greatest disadvantage because of the shortage of mathematics and science teachers.

Mathematics and science are two subject fields which illustrate shortages existing in a time of overall teacher surplus. Other shortage areas include agriculture, industrial arts, some fields of special education, and some other vocational subjects. Because the shortage of mathematics and science teachers has received so much press coverage, it can serve as a useful case study for other subject fields which are likely to face shortages in the next ten years.

QUALITY ISSUES

Student interest in teacher education has been declining in recent years, and several factors appear to be contributing to this phenomenon. The number of available teaching jobs has decreased. Women and racial minorities are moving into other careers that formerly were not available to them. Salary discrepancies remain between first year teachers and those entering business or industry. High school counselors appear to be discouraging able students from entering teacher education. Finally, working conditions in the schools need to be improved.

Because of these factors, the number of certified graduates in teacher education will continue to decline throughout this decade. This projection exists concurrently with the projection that by 1990 there will be an increase of over two million elementary pupils (Frankel & Gerald, 1982). By 1988, only 82.1% of the need for new teacher graduates will be met (National Education Association, 1983).

Teacher shortages may lead to questionable hiring practices. According to information provided by NCES (Condition, 1983), there were approximately 5,000 elementary and secondary teachers who held bachelor's degrees, but were not certified to teach. Thus, teachers hired in 1980-81 included both certified and non-certified teachers--a phenomena that appears strange in times when an oversupply of certified teachers exists.

Hiring uncertified teachers is particularly evident in fields of extreme teacher shortage. In 1979-80 in North Carolna, 45% of all teachers in grades 7-12 who taught one or more classes of mathematics were not certified in mathematics. This pattern is typical of what exists nationwide. The most common practice for dealing with extreme teacher shortages is to issue emergency certificates. In Texas in 1980-81, 283 emergency permits to teach mathematics and 219 emergency permits to teach science were issued.

Certification vs. qualification also is an issue. In science, many teacher education graduates are initially certified in only one of the science specialities. With as few as two or three more college courses, they can earn an all-inclusive science certificate, enabling them to teach any science course in grades 7-12 despite the probability that they are really unqualified to teach many of these courses.

The teacher shortage/surplus picture for specific teaching fields varies from one geographic region to another. In the Northeast, for example, there is an oversupply of elementary and secondary teachers in all but a few selected areas, while general teacher shortages are anticipated in the Midwest, Southern and Western regions. Teacher shortages in all regions are occurring in

mathematics, science, industrial arts, and special education.

In some states, primarily in the Southeast, state test requirements for admission to teacher education institutions have probably contributed to the teacher shortages. In Florida, for example, teacher training institutions reported reductions from 10% - 40%; a drop in Black admissions; a decrease in industrial arts enrollment by 75%; and a drop of 50% in the number of transfers from community colleges. Respondents to an AACTE survey suggested that enrollments in Florida were affected by the state testing requirements for admission. States in the Southern Region are characterized by two activities not reported in other parts of the country. They experience declining numbers of certified graduates and declining enrollment due to the initiation of competency tests prior to certification. This lack of certified graduates has resulted in active out-of-state recruitment.

In all geographical regions, many states reported a teacher surplus in art, health, physical education, and social studies. Yet, only two states reported any consideration of efforts to balance the supply and demand picture by curtailing enrollment in teacher education programs in the surplus areas.

The academic caliber of students entering teacher education programs is low and declining at a faster rate than that of college students in general. This picture is compounded by the fact that teachers tend to leave the field early in their careers and the most academically able are often the first to leave.

Competency exams as a prerequisite for certification and financial rewards are two phenomena receiving much emphasis as means of addressing questions of student quality in teacher education. There seems to be agreement that efforts to strengthen teacher quality must focus on recruitment of high quality students and improvement of programs, as well as making the profession more attractive. Nearly all of the recommendations for improved quality in education have favored a competency approach to the selection and certification of teachers.

Recruiting high quality students into mathematics and science education only addresses part of the problem. Getting these students to take teaching positions once they are certified also is a major problem. In several states, fewer than 50% of those certified to teach mathematics and science actually accept teaching positions. They select other, more profitable fields.

There is much emphasis in the literature on the quality of teacher education programs. AACTE's Profile of a Beginning Teacher proposes that there be emphasis on (1) the general education aspects of the program, (2) the content of the subject field, (3) the social and behavioral sciences that undergird education, and (4) the knowledge base for pedagogy including additional attention to the study and practice of teaching as a discipline requiring analysis and evaluation. Agreement by the profession on the substance of these components should be a first step in improving the quality of programs.

Because most Americans have first-hand experience with schools and teachers, they believe that they are authorities on teacher quality. There is limited public acceptance that effective teaching actually is built on skills and knowledge of pedagogy. The profession itself should more aggressively

define the characteristics and skills that are necessary for "good" teaching and take responsibility for informing the public. In addition, it should confront power structures espousing impossible solutions to teacher quality issues and provide leadership in determining solutions.

Finally, there is growing sentiment that teacher education programs unable to meet national standards through agencies like NCATE should be denied the opportunity to prepare teachers.

RECOMMENDATIONS FOR CHANGE IN TEACHER EDUCATION

The task force conducted two surveys of teacher education institutions to determine the existence of efforts to alleviate teacher shortages and improve the quality of their programs. Respondents were asked in the first survey if action was underway to attract and retain secondary majors in mathematics and science. In the second survey respondents were asked to rank-order items perceived to affect the quality of teacher education graduates in their institutions. They were also asked to indicate the status of change, if any, underway in their particular institution relative to the same items. The areas examined in the second survey included: (1) students in teacher education programs; (2) components in teacher education programs; (3) areas of support for teacher education programs; and, (4) requirements for teacher certification. Findings from these surveys are referred to in the remainder of this section.

First, the task force believes that the primary concern of teacher education should be quality control in programs. It should pervade all decisions in program development for teacher education and affect all decisions concerning the recommendation of a student for certification to teach.

It is well documented by the National Center for Education Statistics that, compared to achievement scores of entering freshmen in other fields, test scores are lower for freshmen entering teacher education. Many teacher education institutions appear to be responding to this phenomenon--often in conjunction with state mandate--by requiring program entrance exams that indicate basic skills and/or competency exams as prerequisites for certification. Such efforts to control the quality of students who enter and exit teacher education programs are viewed as positive steps consistent with recommendations from the literature on the quality of teacher education programs.

Little effort was reported by teacher education institutions for increasing student interest in teacher education. In mathematics and science, where teacher shortages are already critical, slightly less than half of those responding indicated any special effort underway to attract students into these fields. Several key factors contribute to the phenomenon of declining student interest in teacher education, yet the data collected by the task force show very little activity by teacher education institutions to address the problem. For example, women and racial minorities who used to select a career in education because opportunities in other fields were limited are now selecting careers in other, more profitable fields now open to them. While such moves are understandable, the result may be that some of the most talented college

students no longer select teacher education as a major. AACTE and teacher education institutions must be concerned about this loss of talented students and develop plans for overcoming this loss.

The problems will become compounded with the pending teacher shortage in many more fields. With a predicted increase in the number of elementary pupils, a decrease in the number of students entering teacher education institutions, a decline in the quality of students interested in teacher education and the tightening of admission and graduation requirements for teacher education, conditions are ripe for a major increase in the numbers of teachers hired to teach subjects outside of their own academic specialization. Major interventions to recruit and retain increased numbers of highly qualified students into teacher education are essential to the genuine improvement of American schools.

The teacher supply and demand picture often varies significantly from one subject field to another and from one geographical region to the next. Therefore, the balancing of teacher supply and demand nationwide could be assisted through the recruitment efforts of teacher education institutions. Immediate steps should be taken to recruit increased numbers of high quality students into the shortage areas of mathematics, science, industrial arts, and special education. The intent of such an effort is to prevent teacher shortages. Conversely, if there is an over-supply of teachers in certain fields, institutions in the affected state or region should initiate steps to curtail enrollment in those programs until such time that supply and demand are balanced.

Working conditions in schools have been cited as one of the reasons for declining student interest in teacher education. It seems to this task force that retention efforts ought to focus both on retaining high quality students in their teacher education programs and on helping to disseminate information related to the improvement of conditions in schools where their graduates will work.

There is strong evidence of change in teacher education programs to more adequately address issues of quality. More attention is being given to field experiences, program substance, and evaluation. There is also increased emphasis on faculty/staff development activities and coordination with field-based educators and faculty in other disciplines. However, each institution should closely examine its programs to ensure that depth is evident in each academic field for which a secondary major will become certified. Prospective junior high teachers need depth as well as breadth in the discipline(s) they will be teaching.

Teacher education institutions are one of many groups that influence change and direction in elementary and secondary schools. Despite what other groups do to improve teacher education, AACTE and its member institutions must initiate a much more visible role and assume increased responsibility for the quality of the teaching profession.

Changes reported by SCDEs focused on the following:

- o raising standards for students entering teacher education programs;
- o changing program components and structure;
- o strengthening program evaluation;
- o offering faculty/staff development activities;
- o coordinating with field-based educators and other academic disciplines on campus; and
- o "minor action" to address teacher shortages in mathematics and the sciences.

The changes underway in SCDEs is consistent with some of the issues identified by the task force. However, the reported changes are narrow in focus. The major attention of SCDEs seems to be on the students who enter their programs, the programs themselves, and improvement of the faculty.

Perhaps SCDEs see the other issues discussed above as falling outside of their purview. This task force does not agree with such a stand. If quality in elementary and secondary schools is to be improved, SCDEs cannot concern themselves with their own students, program and faculty alone. They must also be concerned with the broader issues.

RECOMMENDATIONS FOR AACTE

An appropriate agenda for change in teacher education institutions must address issues of teacher shortage and surplus and their impact on quality education. Specifically, teacher educators should address the following:

- o declining student interest in teacher education;
- o maintaining "field specific" balance in teacher supply and demand;
- o student quality;
- o program quality with emphasis on requirements to be <u>qualified</u> to teach not just <u>certified</u> to teach;
- o faculty quality;
- o educating the public; and
- o forcing higher education institutions with inadequate teacher education programs to either improve or disband their programs.

The specific recommendations directed to AACTE for the purpose of ensuring the implementation of this agenda in teacher education institutions are outlined here.

AACTE should continue its efforts to identify indicators of quality in teacher education programs. These efforts should become the primary agenda for the Task Force on Quality Issues in Teacher Education.

After the identification of quality indicators has been accomplished, AACTE should provide leadership in developing effective procedures for encouraging and enhancing excellence in teacher education programs while pressuring substandard programs to improve or eliminate their programs. In this regard, AACTE should continue its support of NCATE and encourage all member institutions to submit their teacher preparation programs to NCATE review for accreditation.

AACTE should assume responsibility, in cooperation with the National Center for Education Statistics, for an ongoing study of the teacher shortage/surplus issue. This study should also seek to determine how current teacher education program policies may be contributing to the problems of teacher supply/demand or out-of-field teaching. Steps should then be identified which would effectively modify the policies and/or program.

AACTE should provide leadership in the collection of teacher supply/demand data. The purpose of this activity would be to attain the following objectives: (a) the adoption of similar formats, definition of terms, and collection procedures to enable comparisons within and across state boundaries; and (b) trend-line data that are comparable from year-to-year and from state-to-state. Coordination of this activity by AACTE, in cooperation with its state affiliates, would help to eliminate unnecessary duplicative effort while ensuring that the necessary information becomes available in a useful and timely manner.

AACTE should provide a clearinghouse containing successful programs for recruiting and/or retaining teachers in fields of surplus in order to certify them in fields of shortage. Information about these programs and funding opportunities should be made available to all member institutions and state and local education agencies.

AACTE should initiate a national effort to respond to recent reports which recommend the issuance of emergency certificates to candidates who have not completed teacher education programs. This effort should include a call for a moratorium to end this practice and request that member institutions not cooperate with state and/or local education agencies which seek to continue the practice. (This activity is being addressed currently by the AACTE Task Force on Certification.)

AACTE should move to counteract negative publicity related to the academic caliber of students currently entering teacher education programs. Such counteraction could be achieved by disseminating information explaining the following steps being taken by member institutions to improve the quality of the candidate pool: tests of basic skills at entry into teacher education, higher grade point average requirements, and changes in exit standards.

AACTE, through its state affiliates, should encourage member institutions to assume a leadership role in influencing changes in certification standards within states.

The information contained in this task force report should be disseminated by AACTE as broadly as possible to SCDEs, state education agencies, national professional associations and all of the other agencies responsible for ensuring the quality of instruction in our nation's schools. A special effort should be made to share this task force report with institutional undergraduate advisors, other teacher educators, and, secondary school guidance counselors.

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Appendix A

A DISCUSSION OF LIMITATIONS

An extension of the brief discussion of limitations at the beginning of Chapter 1 is provided for the reader who wants a more fully defined context within which to evaluate the data reported.

1. Time periods used in the reports differ depending on whether the unit of measure is the calendar year, a state's fiscal year, or the federal fiscal year. The academic year for school systems may differ from the academic year for teacher education institutions. Reports may cover the 9-month academic year or the 12-month academic year. The 12-month academic year report may be from January through December, June through May, or September through August.

2. Different reports may appear to contain comparable data when in fact they do not. For instance:

   a. One count of elementary and secondary students may be of enrollment, a second may be of membership, a third may be of average daily membership, and a fourth may be of average daily attendance;

   b. One count of K-12 students may be of those in public and private schools, a second may be of those in public schools only;

   c. One count of college students may be of all levels, a seond may be of baccalaureate only;

   d. One count of college students may be a head count, a second may be FTE;

   e. One count of college students may include both full-time and part-time, a second may be of only full-time students;

   f. One count of college students may include only degree students, a second may also include special and/or unclassified students;

   g. One count of college students in teacher education programs may include only those coded in programs in the 0800 (Education) section of the HEGIS code*; a second may include all those who are in a program which leads to teacher certification;

   h. One count of teacher supply may be a fall estimate to cover the whole academic year; a second may be an actual count of those who completed a program;

*The Higher Education General Information System taxonomy is a listing of programs, grouped by major fields, such as Agriculture and Education. If an institution has coded its agricultural education curriculum under agriculture, and its English education curriculum under English, enrollments in these programs will not be counted under education.

i. One count of teacher supply may be of all those who completed a program; a second count may be only those who are in the labor market for a teaching position; and

j. Some reports include duplicated counts which inflate the total; others may include double-counting in separate columns but not in the totals, while still other reports may have unduplicated entries.

3. Even common terms have different meanings in reports that deal with supply and demand issues. The following terms are used throughout the reporting of data in this chapter. The use of each one depends on the perspective of the author:

a. Teacher Supply

Three groups which have a vested interest in teacher supply use the concept in eleven different ways:

Perspective	Interpretation
Teacher education institution	1. Number of BA/BS graduates certified, and/or 2. Number of post-baccalaureate certificate program completions, and/or 3. Number of graduate students also completing initial certification requirements.
State agency	4. Number of program completions in teacher education institutions who are granted certification, and/or 5. Number of in-migrants from out-of-state, and/or 6. Number of inactive certificates reactivated, and/or 7. Number of emergency/provisional/temporary certificates issued.
Local school district	8. Number of newly certified teachers who apply for employment, and/or 9. Number of non-teaching persons who apply for employment, and/or 10. Number of teachers employed elsewhere who apply for employment in their district, and/or 11. Number of non-certified persons available to teach in field of shortage.

b. Teacher Demand

This term is used interchangeably with need, number of openings, and number of new hires. Its meaning is affected by the time of year. In September, for example, demand is high while in May, demand may be perceived as low.

The following scenarios illustrate the difficulty of obtaining an accurate picture of demand because of common school practices which mask the true needs of a school system:

- o A school district has a social studies teacher assigned out-of-field all day in eighth grade mathematics. No catastrophes occur and the principal renews that teacher's assignment. There is a real need for a mathematics teacher, but there is no opening, no new hire, and therefore no apparent demand.

- o Later in the summer, another social studies teacher (in-field) in the same school resigns. The principal chooses to leave the first teacher where he/she is and seeks another social studies teacher. There is a need for a mathematics teacher, but the school lists a need, and position opening, for a social studies teacher.

- o If the principal had filled the social studies position by shifting the out-of-field teacher, then the need, the opening, and the demand would all be in mathematics, but the new hire might be someone certified in home economics.

- o If a high school principal has an opening for a combination chemistry/physics teacher, the need and demand is for a physical science teacher. If no appropriately certified and qualified person is hired, the courses are cancelled. In this case, no new hire is reported, and no unfilled vacancy exists, although there is a need.

To complicate interpretation of teacher demand data further, studies usually consider only one school year and do not typically mention needs for which there were no openings, as in the first scenario above. A continuing need may go unreported for years this way. Additionally, if demand is defined as the number of new hires, and new hires are reported by certification area rather than by the teaching assignment, a true picture of demand is distorted.

Appendix B

TEACHER SURPLUSES AND SHORTAGES BY SUBJECT AND STATE

TABLE 11

Teacher Surpluses and Shortages by Subject and State

CODE:

1 = SEVERE SURPLUS
2 = SURPLUS
3 = BALANCE
4 = SHORTAGE
5 = SEVERE SHORTAGE

		ALABAMA	ALASKA	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECTICUT	DELAWARE	DISTRICT OF COLUMBIA	FLORIDA	GEORGIA	HAWAII	IDAHO	ILLINOIS	INDIANA	IOWA	KANSAS	KENTUCKY	LOUISIANA	MAINE	MARYLAND	MASSACHUSETTS	MICHIGAN	MINNESOTA	MISSISSIPPI	MISSOURI	MONTANA	NEBRASKA	NEVADA	NEW HAMPSHIRE	NEW JERSEY	NEW MEXICO	NEW YORK	NORTH CAROLINA	NORTH DAKOTA	OHIO	OKLAHOMA	OREGON	PENNSYLVANIA	RHODE ISLAND	SOUTH CAROLINA	SOUTH DAKOTA	TENNESSEE	TEXAS	UTAH	VERMONT	VIRGINIA	WASHINGTON	WEST VIRGINIA	WISCONSIN	WYOMING
ELEMENTARY	REGULAR INSTRUCTION			2						4	2			2			2		5						1		1					2				3				1			1		1			2
	ART																2																										1				2			
	MUSIC																4																										1				3			
	PHYSICAL ED. & HLTH																2																										1				2			
	READING																4					4												4										5			4			
	SPECIAL EDUCATION																5																4									3				4			
SECONDARY 69	ART													2			2					2	2		3		2						2					2				1	2		3		2			3
	BILINGUAL				4					3							4					4											4										4							
	BIOLOGY/LIFE SCIENCE	2	2	3	3	3	3	3	2	3	3	3	3	2	3	4	2	3	3	3	3	2	1	2	2	3		3	3	3		3	2	3	3	3	2	2	3	4	3	2	2	3	4	3	3	3	3	3
	BUSINESS										3						3						1			2		3											4							3		4			3
	ENGLISH/LANG. ARTS										4					4		4					1	4		3		3						2					3				1			3		3			3
	FOREIGN LANGUAGE										3					2		3					1	2		3		3						2					3				3			3		4			3
	GENERAL SCIENCE	3	2	5	3	3	4	4	2	3	4	5	3	3	4	5	3	3	3	3	3	3		2	4	4		3	3	4			3	3		3	2	3	2	3	3	3	2	5	3	4	3	4	4	4	3
	HOME ECONOMICS										3					4		2								3		2						2					3				1			3		3			3
	INDUSTRIAL ARTS	4		4	4	5					4	4				3	4	4	3	4	3	3	2		3	4	3	4	4		4	3	3	4	3	5		3			4	3	5		3	3	4			3
	MATHEMATICS	4	2	4	4	4	5	5	4	5	4	5	4	4	5	4	5	5	5	4	4	5		3	4	3	5		4	4	5			5	4	4	4	4	4	5	4	5	5	4	5	5	4	5	5	4	4	5	4	4	4
	MUSIC																4						3	4		3		4						4					3				1	2		3		4			3
	PHYSICAL ED. & HLTH														2		2							2		1		2					4	2				2				1	2		3		1			2
	PHYSICAL/EARTH SCI.	4	2	4	4	4	4	4	3	3	5	3	4	4	5	5	4	4	4	4	5	4		1	4	4	4		4	3	5			4	4	5	3	5	4	5	3	5	4	4	4	4	4	4	4	4	4	4	3
	SOCIAL STUDIES										3	5			2			2						2		2		3						2					2				1	2		3		1			2
	SPECIAL EDUCATION					4						5				4		5		5			3			3							5	4								3	4				4			
	TECH. & VOCA. EDUC.				4	4				5				4		5	5						4	4		4		4						4		4			4			5	3	4		3		4			3
K-12	ART																																																		
	MUSIC																																																		
	PHYSICAL ED. & HLTH																																																		
	SPECIAL EDUCATION				4					5	4					5	5		4					4		4		3						4								5			3	4	4			4
OVER	ALL STATE SITUATION																																																2			

Appendix C

SURVEY INSTRUMENT

Survey of Teacher Shortages in Math and Science

by the

AACTE Task Force on Shortage/Surplus/Quality Issues
in Teacher Education

AMERICAN ASSOCIATION OF COLLEGES FOR TEACHER EDUCATION
One Dupont Circle, Washington, D.C. 20036 (202) 293-2450

SURVEY OF TEACHER SHORTAGES IN MATH AND SCIENCE

by the
AACTE TASK FORCE ON SHORTAGES/SURPLUS/QUALITY ISSUES

PART I. Institution Specific Issues

Has there been, since Fall 1980, a significant drop in enrollment in your teacher preparation programs for

1) Secondary Mathematics? Yes _____
No _____

2) If YES, is this enrollment decrease greater than in other teaching fields? Yes _____
No _____
Don't Know _____

3) Secondary Biology/Life Science? Yes _____
No _____

4) If YES, is this enrollment decrease greater than in other teaching fields? Yes _____
No _____
Don't Know _____

5) Secondary Physical/Earth Science? Yes _____
No _____

6) If YES, is this enrollment decrease greater than in other teaching fields? Yes _____
No _____
Don't Know _____

7) Is the demand in school districts in your service area greater for secondary math and science than in other teaching fields? Yes _____
No _____
Don't Know _____

Is your institution making any special arrangements to

8) Attract secondary math education majors? Yes _____
No _____

9) Attract secondary Biology/Life science education majors? Yes _____
No _____

10) Attract secondary Physical/Earth education majors? Yes _____
No _____

11) Retain secondary math education majors? Yes _____
No _____

12) Retain secondary Biology/Life science education majors? Yes _____
No _____

13) Retain secondary Physical/Earth education majors? Yes _____
No _____

14) If YES to any of 8-13, briefly explain the nature of these arrangements.

PART II. State Specific Issues

1) In which state is your institution located? _____

Is there a documented shortage of

2) Secondary Mathematics Teachers in your state? Yes ____
No ____
Don't Know ____

3) Secondary Biology/Life Science Teachers in your state? Yes ____
No ____
Don't Know ____

4) Secondary Physical/Earth Teachers in your state? Yes ____
No ____
Don't Know ____

5) To what extent does the science teacher shortage in your state (if there is one) apply to the biology/life sciences, as compared to the physical/earth sciences?

____No science teacher shortage
____Balanced shortage between both fields
____Shortage is considerably greater in biology/life sciences
____Shortage is considerably greater in physical/earth sciences

Comments:

6) What devices do local school districts in your state use to combat teacher shortages in mathematics and science? Rank in order: 1 = most prevalent device used, etc.

____ Arrange for persons to get emergency/provisional certification, with state agency involvement
____ Arrange for persons to get emergency/provisional certification, without state agency involvement
____ Cancel courses as necessary
____ Cancel courses, but usually only if 11th and 12th grade electives
____ Increase class size
____ Provide incentives to hire the teachers they need, e.g., salary supplements, workload adjustments, etc.
____ Recruit teachers from other states
____ Use non-certified persons
____ Use other teachers out-of-field
____ Other, specify:

7) What action has each of the following groups in your state taken with regard to the mathematics and/or science teacher shortage?

Check all that apply:

	Not Addressing The Problem	Discussion Stage	Minor Action Taken	Major Action Taken	No Knowledge Of What Action This Group Has Taken
Legislative					
State Board of Education					
State Department of Education					
Local School Districts					
Teacher Education Institutions					
State AACTE-affiliate					
General Teacher Organizations (AFT/NEA affiliates)					
NCTM-affiliate					
NSTA-affiliate					
Others (Please List)					

8) If you checked any "Major Action Taken" boxes, please briefly explain what's happening:

9) Which students in your state are at a disadvantage from the mathematics and/or science teacher shortage? Check all that apply:

a) ___ High School ___ Middle/Junior High ___ Elementary
b) ___ Rural ___ Urban ___ Suburban
c) ___ College-prep ___ Vocational ___ General
d) ___ High achievers ___ Average achievers ___ Low achievers

10) If any school districts in your state have salary supplements for mathematics or science teachers, please list them:

11) Other comments on this topic you would like to share:

PLEASE RETURN THIS SURVEY TO:

INFORMATION SERVICES
American Association of Colleges
for Teacher Education
One Dupont Circle
Suite 610
Washington, D.C. 20036

Appendix D

SURVEY INSTRUMENT

Survey of Recent Changes in Teacher Education Practice

by the

AACTE Task Force on Shortage/Surplus/Quality Issues
in Teacher Education

AMERICAN ASSOCIATION OF COLLEGES FOR TEACHER EDUCATION
One Dupont Circle, Washington, D.C. 20036 (202) 293-2450

SURVEY OF RECENT CHANGES IN TEACHER EDUCATION PRACTICE

by the

AACTE Task Force on Shortage/Surplus/Quality Issues

I. QUALITY ISSUES

DIRECTIONS: The following is a list of areas where change may occur to improve the quality of teacher education graduates. First, under the heading "RANK," rank the items within each of the three categories as to their importance for affecting the quality of teacher education graduates in your institution. Second, under the heading "Status of Change" circle the appropriate number that describes the status of these items for your elementary and secondary teacher education programs. Only major qualitative changes should receive a response of 1 or 2. If an item is not applicable to your institution, leave the item blank. Definition of the numbered response choices are as follows:

0 No major change under consideration at this time
1 Major change is being formally discussed or planned
2 Implementation of a major change is under way or change has been made (within the last 2 years)

	RANK	Status of Change: Elementary	Status of Change: Secondary
CATEGORY 1: QUALITY OF STUDENT			
1. Test of basic skills as entry requirement	____	0 1 2	0 1 2
2. Increase in GPA as entry requirement	____	0 1 2	0 1 2
3. Affective or attitudinal measures as entry requirement	____	0 1 2	0 1 2
4. Change in exit standards in teacher education program	____	0 1 2	0 1 2
5. Other _____	____	0 1 2	0 1 2

	RANK	Status of Change: Elementary	Status of Change: Secondary
CATEGORY 2: QUALITY OF PROGRAM			
1. Teacher education course content	___	0 1 2	0 1 2
2. Teacher education program reorganization	___	0 1 2	0 1 2
3. Pre-student teaching field experience	___	0 1 2	0 1 2
4. Student teaching supervision	___	0 1 2	0 1 2
5. Increased number of hours for teacher education	___	0 1 2	0 1 2
6. Graduate teacher education programs	___	0 1 2	0 1 2
7. Inservice teacher education programs	___	0 1 2	0 1 2
8. Internship or fifth year program	___	0 1 2	0 1 2
9. Induction program for new teachers	___	0 1 2	0 1 2
10. Teacher education program evaluation	___	0 1 2	0 1 2
11. Faculty	___	0 1 2	0 1 2
12. Other _____	___	0 1 2	0 1 2
CATEGORY 3: SUPPORT OF PROGRAM			
1. Faculty/staff development activities	___	0 1 2	0 1 2
2. Administrator/faculty relations	___	0 1 2	0 1 2
3. Coordination/collaboration with other academic disciplines	___	0 1 2	0 1 2
4. Coordination/collaboration with field based educators	___	0 1 2	0 1 2
5. Conduct of research in teacher education	___	0 1 2	0 1 2
6. Administrative reorganization affecting teacher education	___	0 1 2	0 1 2
7. Increase in financial resources	___	0 1 2	0 1 2
8. Other _____	___	0 1 2	0 1 2

II. STATE TEACHER CERTIFICATION ISSUES

DIRECTIONS: The following items are designed to obtain information regarding teacher certification standards in your state. Please respond to those items that apply to you and your institution.

1. Have teacher certification standards recently been changed in your state (within the last five years)? Yes _____ No _____

2. If yes to #1, do you feel these changes will affect the quality of teacher education graduates? Yes increase _____ Yes decrease _____ No effect _____

3. If yes to #1, do you think these changes in teacher certification standards resulted in changes in your teacher education programs? Yes _____ No _____

4. If yes to #3, do you think the changes made in your program were positive? Yes _____ No _____

5. If yes to #1, how much influence do you think each of the following organizations or groups had on the change in standards for the certification of teachers?

	None				Great Deal
a. Teacher Education	1	2	3	4	5
b. State Department of Education	1	2	3	4	5
c. Teacher Organizations	1	2	3	4	5
d. School Administrators	1	2	3	4	5
e. Parent or Lay Groups	1	2	3	4	5
f. School Boards	1	2	3	4	5
g. Legislators	1	2	3	4	5
h. Other Governmental Agencies	1	2	3	4	5
i. Other _____	1	2	3	4	5

COMMENTS:

III. DEMOGRAPHICS. Please complete the following demographic information.

Institution: _____

Your Name and Title: _____ _____ _____

Address: _____

Your Institution Is: Private _____ Public _____

Please give the approximate number of undergraduate teacher education graduates from your institution in 1981-82. _____

On behalf of the AACTE Task Force on Teacher Shortage/Surplus/Quality Issues, thank you for your cooperation in this survey.

Please mail this questionnaire to the following address: Dr. Ronald D. Adams
College of Education
Western Kentucky University
Bowling Green, KY 42101

Appendix E

SUMMARY ANALYSIS OF TOTAL GROUP RESPONSES TO THE
SURVEY OF RECENT CHANGES IN TEACHER EDUCATION PRACTICE

Tables 12 through 14 present item rankings by the categories of change items. Contained in these tables are the frequency and percent of ranks given each item. A mean item rank provides an overall indication of the value placed on an item by respondents. The mean item ranks were computed omitting the no change (zero) responses. From Table 12 it appeared that "test of basic skills at entry" was the most highly ranked item. The item suggesting "affective or attitudinal measures" was the lowest ranked item.

Table 12

SUMMARY OF ITEM RANKS FOR QUALITY OF STUDENT

	ITEM RANK														MEAN**
	ITEM	1st		2nd		3rd		4th		5th		0*		
		f	%	f	%	f	%	f	%	f	%	f	%	
1.	Test of basic skills as entry requirement	78	32.6	59	24.7	26	10.9	22	9.2	3	1.3	51	21.3	2.01
2.	Increase in GPA as entry requirement	38	15.9	53	22.2	52	21.8	81	13.0	4	1.7	61	25.5	2.50
3.	A..ective or attitudinal measures as entry requirement	19	7.9	26	10.9	46	19.2	69	28.9	9	3.8	70	29.3	3.14
4.	Chaige in exit standards in teacher education programs	50	20.9	58	24.3	44	18.4	29	12.1	2	0.8	56	23.4	2.33
5.	Other	12	5.0	4	1.7	3	1.3	4	1.7	6	2.5	210	87.9	2.59

* Category zero were non-responses
** Means were computed without zero

Table 13 contains data for items listed under Quality of Program. These items consisted of some areas common to most teacher education programs and some areas not so commonly found in teacher education. When mean rankings were considered, "teacher education course content" was the area that was perceived to produce the highest quality teacher graduate. The items of "teacher education program reorganization," "pre-student teaching field experience," "student teaching supervision," and "teacher education program evaluation" also received high ranks as areas that could improve the quality of teacher education at the responding institutions. Five of the areas had 40% or more non-responses, indicating a lack of importance or a non-applicable item to many of the responding institutions. These were "graduate teacher education programs," "inservice teacher education programs," "intern or fifth year programs," "induction program for new teachers," and "faculty." It was not surprising that those items dealing with post-graduate teacher education had a low response rate since many of the institutions were small and probably offered only the bachelor's degree. Also, these institutions probably were not as involved in inservice training as others are. It was unclear what was being asked for in the item "faculty," and this item probably had little meaning for those responding to the survey. The intent of the item was faculty expertise or ability to teach. At any rate, this item will provide little help in assessing the areas of program importance in improving quality

of teacher education.

Table 13
SUMMARY OF ITEM RANKS FOR "QUALITY OF PROGRAM"

Item	ITEM RANK 1st f	%	2nd f	%	3rd f	%	4th f	%	5th f	%	6th f	%	7th f	%	8th f	%	9th f	%	10th f	%	11th f	%	12th f	%	0* f	%	MEAN**
1. Teacher education course content	51	21.3	57	23.8	35	14.6	22	9.2	7	2.9	4	1.7	0	0.0	2	0.8	2	0.8	1	0.4	0	0.0	0	0.0	58	24.3	4.11
2. Teacher education program reorganization	31	13.0	35	14.6	19	7.9	16	6.7	15	6.3	17	7.1	8	3.3	13	5.4	7	2.9	2	0.8	6	2.5	0	0.0	70	29.3	5.60
3. Pre-student teaching field experience	27	11.3	33	13.8	33	13.8	25	10.5	19	7.9	10	4.2	14	5.9	2	0.8	4	1.7	8	3.3	0	0.0	0	0.0	64	26.8	5.24
4. Student teaching supervision	15	6.3	18	7.5	15	6.3	26	10.9	32	13.4	21	8.8	10	4.2	11	4.6	10	4.2	3	1.3	1	0.4	0	0.0	77	32.2	6.19
5. Increased number of hours for teacher education	8	3.3	12	5.0	17	7.1	15	6.3	10	4.2	18	7.5	19	7.9	14	5.9	13	5.4	17	7.1	10	4.2	1	0.4	85	35.6	7.20
6. Graduate teacher education programs	8	3.3	8	3.3	4	1.7	10	4.2	14	5.9	17	7.1	13	5.4	15	6.3	13	5.4	14	5.9	12	5.0	1	0.4	110	46.0	7.74
7. Inservice teacher education programs	4	1.7	7	2.9	4	1.7	9	3.8	9	3.8	14	5.9	22	9.2	19	7.9	21	8.8	11	4.6	11	4.6	1	0.4	107	44.8	7.93
8. Internship or fifth year program	5	2.1	3	1.3	7	2.9	11	4.6	9	3.8	3	1.3	8	3.3	18	7.5	17	10.9	26	10.9	18	7.5	1	0.4	113	47.3	8.21
9. Induction program for new teachers	5	2.1	4	1.7	5	2.1	8	3.3	10	4.2	11	4.6	14	5.9	13	5.4	23	9.6	16	6.7	15	6.3	1	0.4	114	47.7	8.15
10. Teacher ed. program eval.	28	11.7	22	9.2	20	8.4	20	8.4	19	7.9	20	8.4	13	5.4	9	3.8	3	1.3	11	4.6	5	2.1	1	0.4	68	28.5	5.88
11. Faculty	49	20.5	10	4.2	11	4.6	10	4.2	15	6.3	7	2.9	12	5.0	5	2.1	5	2.1	5	2.1	10	4.2	0	0.0	100	41.8	6.23
12. Other	3	1.3	1	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4	0	0.0	0	0.0	0	0.0	4	1.7	230	96.2	8.92

* Category zero were non-responses
** Means were computed without zero

Table 14 provides a summary of data gathered from items under the category Support of Program. "Faculty/staff development activities" received the highest rankings with "coordination with field based educators" and "coordination with other academic disciplines" also receiving high ranks. Administrative changes and research were at the low end of the rankings indicating less value placed on these areas as means to improve quality in teacher education graduates.

Table 14

SUMMARY OF ITEM RANKS FOR "SUPPORT OF PROGRAM"

ITEM	ITEM RANKS 1st f	1st %	2nd f	2nd %	3rd f	3rd %	4th f	4th %	5th f	5th %	6th f	6th %	7th f	7th %	8th f	8th %	0* f	0* %	MEAN
1. Faculty/staff development activities	58	23.1	47	18.7	36	14.3	21	8.4	10	4.2	6	2.5	1	0.4	0	0.0	70	29.3	2.47
2. Administrator/faculty relations	12	5.0	19	7.9	12	5.0	24	10.0	31	13.0	34	14.2	22	9.2	0	0.0	85	35.6	4.51
3. Coordination/collaboration with other academic disciplines	25	10.5	33	13.8	43	18.0	29	12.1	23	9.6	11	4.6	6	2.5	0	0.0	69	28.9	3.29
4. Coordination/collaboration with field based educators	20	10.0	51	21.3	38	15.9	26	10.9	12	5.0	9	3.9	6	2.5	0	0.0	71	29.7	2.39
5. Content of research in teacher education	13	5.4	15	6.3	20	8.4	23	9.6	29	12.1	30	12.6	19	7.9	2	0.8	88	36.8	4.43
6. Administrative reorganization affecting teacher education	12	5.0	12	5.0	9	3.8	10	4.2	19	7.9	29	12.1	53	22.2	2	0.8	93	38.9	5.18
7. Increase in financial resources	40	16.7	20	8.4	13	5.4	20	8.4	20	8.4	18	7.5	20	8.4	0	0.0	39	16.3	3.63
8. Other	2	0.9	1	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	4	1.7	232	97.1	5.50

* Category zero were non-responses
** Means were computed without zero

It should be noted that there were several respondents who did not rank any of the items for any category. These non-responses make it difficult to interpret the overall meaning of the rank data. However, those responses that were obtained provide some indication of where teacher education leaders place their confidence for improving the quality of their graduates.

STATUS OF CHANGE

The respondents were asked to indicate the status of change (i.e., no change, planning for change, or recent changes) for each of the items under the three categories. It was thought that there may be major differences for elementary and secondary teacher education programs. However, the responses were quite similar for these two levels suggesting that changes occur across both program areas in a generic fashion rather than separately by program. This observation is highly speculative and the obtained data do not specifically address this hypothesis. At any rate, the difference between elementary and secondary categories are quite small and suggest no meaningful reasons for comparative analysis. Thus, no differentiation between elemenatary and secondary data were made when discussing summary data for items.

The summary data presented in Table 15 suggest that change is occurring to increase the quality of the student in teacher education both at entry into and exit from teacher education programs. Over 60% of the respondents have indicated change or planning for change in "test of basic skills at entry" and "change in exit standards." Few institutions reported "affective or

attitudinal measures at entry" as an area where change had occurred or was being planned. These findings are consistent with the ranking of the items.

Table 15

STATUS OF CHANGE FOR ITEMS UNDER "QUALITY OF STUDENT"

ITEM	Elementary: No Change f	Elementary: No Change %	Elementary: Planning Change f	Elementary: Planning Change %	Elementary: Recently Changed f	Elementary: Recently Changed %	Secondary: No Change f	Secondary: No Change %	Secondary: Planning Change f	Secondary: Planning Change %	Secondary: Recently Changed f	Secondary: Recently Changed %
1. Test of basic skills as entry requirement	77	32.2	71	29.7	91	38.1	82	34.3	69	28.9	88	36.8
2. Increase in GPA as entry requirement	135	56.5	36	15.1	68	28.5	135	56.5	36	15.1	68	28.5
3. Affective or attitudinal measures as entry requirement	198	82.8	26	10.9	15	6.3	201	84.1	23	9.6	15	6.3
4. Change in exit standards in teacher education program	83	34.7	80	33.5	76	31.8	86	36.0	78	32.6	75	31.4
5. Other	211	88.3	14	5.9	14	5.9	214	89.5	13	5.4	12	5.0

The two items under Quality of Program most often given as having recently changed to improve teacher education were "teacher education course content" and "teacher education program evaluation." The items of "teacher education program reorganization" and "pre-student teaching field experience" also were areas where change had occurred or was anticipated. Table 16 contains the summary data for items under Quality of Program. While student teaching was ranked high as an item of importance to quality, slightly more than 30% or the respondents reported planning for change or recent change in this area. Items having the least amount of change activity were internship and induction programs for graduates. Since these are relatively new concepts to teacher education, the lack of reported change is understandable. Overall, the reported change in program items is consistent with the value placed on these items via the ranking data.

Table 16

STATUS OF CHANGE FOR ITEMS UNDER "QUALITY OF PROGRAM"

ITEM	Elementary: No Change f	Elementary: No Change %	Elementary: Planning Change f	Elementary: Planning Change %	Elementary: Recent Change f	Elementary: Recent Change %	Secondary: No Change f	Secondary: No Change %	Secondary: Planning Change f	Secondary: Planning Change %	Secondary: Recent Change f	Secondary: Recent Change %
1. Teacher education course content	78	32.6	83	34.7	78	32.6	77	32.2	80	33.5	82	34.3
2. Teacher education program reorganization	107	44.8	69	28.9	63	26.4	103	43.1	68	28.5	68	28.5
3. Pre-student teaching field experience	118	49.4	47	19.7	74	31.0	114	47.7	52	21.8	73	30.5
4. Student Teaching supervision	166	69.5	38	15.9	35	14.6	164	68.6	41	17.2	34	14.2
5. Increased number of hours for teacher ed.	157	65.7	39	16.3	43	18.0	146	61.1	45	18.8	48	20.1
6. Graduate teacher education programs	140	58.6	56	23.4	43	18.0	147	61.5	47	19.7	45	18.8
7. Inservice teacher education programs	155	64.9	46	19.2	38	15.9	157	65.7	44	18.4	38	15.9
8. Internship or fifth year program	199	83.3	30	12.6	10	4.2	197	82.4	29	12.1	13	5.4
9. Induction program for new teachers	204	95.4	23	9.6	12	5.0	204	85.4	22	9.2	13	5.4
10. Teacher education program evaluation	85	35.6	69	28.9	85	35.6	85	35.6	70	29.3	84	35.1
11. Faculty	173	72.4	38	15.9	28	11.7	174	72.8	42	17.6	23	9.6
12. Other	233	97.5	3	1.3	3	1.3	232	97.1	3	1.3	4	1.7

There appeared to be considerable change or anticipated change reported in three of the seven areas under Support of Program. More than 50% of the responding institutions indicated change or planning for change in "faculty/staff development activities," "coordination/collaboration with other academic disciplines," and "coordination/collaboration with field based educators." "Conduct of research in teacher education" and "administrative reorganization" were items for which nearly 40% of the respondents reported planning or change, a somewhat surprising finding given their low ranking. "Administrator/faculty relations" and "increase in financial resources" were the least often reported items where change was occurring. Table 17 contains summary data for status of change for items under Support of Program.

Table 17

STATUS OF CHANGE FOR ITEMS UNDER "SUPPORT OF PROGRAM"

		Status of Change											
		Elementary						Secondary					
		No Change		Planning Change		Recently Changed		No Change		Planning Change		Recently Changed	
	ITEM	f	%	f	%	f	%	f	%	f	%	f	%
1.	Faculty/staff development activities	95	39.7	79	33.1	65	27.2	99	41.4	78	32.6	62	25.9
2.	Administrator/faculty relations	170	71.1	43	18.0	26	10.9	172	72.0	44	18.4	23	9.6
3.	Coordination/collaboration with other academic disciplines	111	46.4	72	30.1	56	23.4	112	46.9	68	28.5	59	24.7
4.	Coordination/collaboration with field based educators	109	45.6	70	29.3	60	25.1	108	45.2	73	30.5	58	24.3
5.	Conduct of research in teacher education	153	64.0	49	20.5	37	15.5	156	65.3	49	20.5	34	14.2
6.	Administrative reorganization affecting teacher education	147	61.5	40	16.7	52	21.8	148	61.9	41	17.2	50	20.9
7.	Increase in financial resources	189	79.1	31	13.0	19	7.9	189	79.1	32	13.4	18	7.5
8.	Other	236	98.7	1	0.4	2	0.8	236	98.7	0	0	3	1.3

PERCEPTIONS OF TEACHER CERTIFICATION

A large percentage of the respondent (82.8%) reported changes in teacher certification in their state within the last five years. The majority of the respondents (68.6%) reporting changes in teacher certification felt they would positively affect the quality of the teacher education graduate. The majority of these respondents (72.8%) also reported that the certification changes have resulted in positive changes in teacher education programs (68.2%). Table 18 contains summary data for perceptions of teacher certification.

Table 18

PERCEPTIONS OF THE INFLUENCE OF CHANGES IN STATE CERTIFICATION ISSUES

ITEM	RESPONSE							
	Yes				No		NR	
	f	%			f	%	f	%
1. Have teacher certification standards recently been changed in your state (within the last 5 years)?	198	82.8			37	15.5	4	1.7
	Yes Increase		Yes Decrease		No		NR	
	f	%	f	%	f	%	f	%
2. If yes, then do you feel these changes have increased or will increase the quality of the teacher education graduate?	164	68.6	4	1.7	30	12.6	41	17.2
	Yes				No		NR	
	f	%			f	%	f	%
3. If yes, then have these changes in teacher certification resulted in changes in your teacher education programs?	174	72.8			25	10.5	40	16.7
	Yes				No		NR	
	f	%			f	%	f	%
4. If yes to #3, then do you feel the changes made in your program were positive?	163	68.2			13	5.4	63	26.4

Since changes in teacher certification standards appear to be a significant force in changing teacher education programs, it was interesting to note the respondents' perception of the extent of influence selected groups have on teacher certification. It was not surprising that the most perceived influential agency was the State Department of Education, as this agency usually has the responsibility for teacher certification in most states. It was also interesting to note that legislators and teacher education institutions were a distant second and third, respectively, and teacher organizations were fourth. These observations are reflected in Table 19.

Table 19

PERCEIVED INFLUENCE OF VARIOUS GROUPS ON THE CHANGE IN CERTIFICATION STANDARDS

	Ratings: No Influence								Great Influence				
	1		2		3		4		5		NR		*
	f	%	f	%	f	%	f	%	f	%	f	%	$\bar{X}$
1. Teacher Education	13	5.4	32	13.4	46	19.2	58	24.3	46	19.2	44	18.4	3.47
2. State Department of Education	1	0.4	2	0.8	23	9.6	48	20.1	126	52.7	39	16.3	4.48
3. Teacher Organizations	19	7.9	40	16.7	63	26.4	44	18.4	29	12.1	44	18.4	3.12
4. School Administrators	19	7.9	57	23.8	78	32.6	26	10.9	12	5.0	47	19.7	2.77
5. Parent or Lay Groups	48	20.1	85	35.6	41	17.2	12	5.0	7	2.9	45	18.8	2.19
6. School Boards	49	20.5	84	35.1	37	15.5	18	7.5	8	3.3	43	18.0	2.25
7. Legislators	13	5.4	32	13.4	49	20.5	52	21.8	50	20.9	43	18.0	3.48
8. Other Governmental Agencies	49	20.5	53	22.2	38	15.9	14	5.9	16	6.7	69	28.8	2.36
9. Other	2	0.8	1	0.4	4	1.7	2	0.8	13	5.4	217	90.8	3.18

*NR (Non-responses) were omitted in calculations of mean ratings.

These findings suggest that other organizations and agencies may influence teacher education programs and practices through their influence on the changes made in teacher certification standards. This conclusion is somewhat supported in recent studies of state mandated competency testing by Sandefur (1980, 1981, 1982).

In summary, the responses to this survey indicate that there is a great deal of change occurring in teacher education. The quality of the students entering teacher education is being considered through increased entry requirements. Changes are occurring within teacher education programs, particularly in instruction related areas, faculty development, collaborative activities with educational units outside teacher education, and evaluation practices. All these activities appear to be in response to the demand for improved quality of new teachers, and partially a result from political demands by state educational agencies and legislators to strengthen state certification standards.

COMPARATIVE ANALYSIS ACROSS SELECTED DEMOGRAPHIC VARIABLES

To further study the self-reported change data, analyses were made across three demographic variables: (a) estimated number of teacher education graduates, (b) funding status (private or public), and (c) status of state mandated teacher certification. Two statistical procedures were employed for these analyses. The data obtained from the ranking of change items and the rating of influence groups were treated as continuous data for which parametric statistical techniques were employed. The change status data (0 = no change, 1 = planning change and 2 = recent change) were treated as categorical data and a non-parametric technique was used to analyze these data across groups formed from the demographic variables. Comparisons of the mean ranks of items for demographic groups will be presented first, followed by the chi square cross tabular analysis of change category by demographic group, followed by the analysis of mean rating of influence groups.

Estimated Number of Teacher Education Graduates

Respondents were asked to estimate the number of teacher education graduates from their institutions for the 1981-82 school year. These estimates were used to form five groups with the smallest group being 0-50 graduates and the largest group being 500-2,500 graduates. Table 20 gives the group limits. Analysis of variance was used to determine the probability that means were different across categories from the item rankings.

Table 20

COMPARISON OF ITEM RANKING BY ESTIMATED NUMBER OF TEACHER EDUCATION GRADUATES

	MEAN RANKING BY GROUPS						
ITEM	0-50	51-130	131-300	301-499	500-2500	F	P
"QUALITY OF STUDENT"							
1. Test of basic skills	2.09	1.93	2.02	2.00	1.73	0.37	.826
2. Increased GPA	2.56	2.25	2.63	2.94	2.29	1.68	.154
3. Attitude/Affective Measures	2.73	3.13	3.23	3.61	3.33	2.45	.048*
4. Exit Standards	2.26	2.46	2.24	2.30	2.31	0.28	.889
"QUALITY OF PROGRAM"							
1. Teacher Ed. Course Content	2.28	2.46	2.73	3.05	2.47	0.96	.426
2. Teacher Ed. Prog. Reorg.	4.40	4.35	3.88	4.20	3.85	0.26	.900
3. Pre-Student Teaching	2.06	2.00	2.64	3.03	2.37	2.76	.029*
4. Student Teaching	4.46	4.42	5.16	5.36	5.20	1.09	.360
5. Increase Hours for T.E.	5.55	6.65	6.62	5.35	6.37	1.22	.301
6. Graduate T.E. Prog.	7.00	6.93	6.00	6.38	7.00	0.67	.610
7. Inservice T.E. Prog.	6.96	7.08	6.97	7.21	7.40	0.08	.985
8. Internship or 5th year	7.82	8.32	7.80	5.33	7.21	2.56	.041*
9. Induction of New Teachers	6.77	7.54	7.60	7.25	7.66	0.43	.786
10. Teacher Ed. Prog. Eval.	4.22	5.09	5.00	5.10	3.80	1.08	.365
11. Faculty	4.02	3.42	4.64	4.76	5.31	1.17	.323
"SUPPORT OF PROGRAM"							
1. Faculty Development	2.13	2.32	2.57	2.65	2.68	0.85	.490
2. Admin/Faculty Rel.	4.18	4.10	4.97	4.70	4.93	1.70	.151
3. Coop. W other Discip.	2.75	3.30	3.50	3.65	3.73	2.02	.092
4. Coop. W Field Educ.	2.85	2.97	3.09	2.95	3.26	0.23	.916
5. Research in T.E.	5.08	4.72	4.04	3.72	3.80	3.02	.019*
6. Administrative Reorg.	4.97	5.54	4.81	5.37	5.86	1.17	.326
7. Increase Financial Sup.	4.02	3.69	3.42	3.47	3.07	0.66	.618

These analyses produced four F values significant at or beyond the .05 level. "Attitude/affective measures" were perceived more important by institutions with 0-50 graduates than by institutions with more graduates from teacher education programs. "Pre-student teaching" was perceived as somewhat less important by institutions with a moderate number of graduates (301-499) than the other groups while this same group perceived "internship or 5th year programs" as more important. "Research in teacher education" was valued more highly by the institutions with more graduates.

The lack of difference in item rankings across the remaining 18 items tends to support a position of consistency in value of these items across the groups. That is, size of graduating class, reflecting the size of the teacher education program, does not greatly alter the perceived value of the items under Quality of Student, Quality of Program or Support of Program.

It should again be stated that the rankings obtained from institutions for items were not as consistently completed as were other data. Thus, the degree to which these findings are valid in reflecting the differences between groups is questionable. However, based on the responses obtained, it appears that private institutions value more highly those items that are program oriented and faculty/administration oriented, and public institutions value more highly research.

More differences were observed between groups when change status data were analyzed via chi square. Table 21 contains the chi square values and probability levels. Eight items were found to have difference distributions of change status across the five groups. For the two items under Quality of Student, "test of basic skills" and "increase in GPA," there appeared to be an increase in reported change or planning for change as the size of the graduating class increased, i.e., the institutions with a larger number of teacher education graduates appear to have more reported change in entry requirements.

Three of the items under Quality of Programs were significant beyond the .05 level. Inspection of the crosstabular presentation of data suggests that a similar pattern exists for items "pre-student teaching field experience" and "inservice teacher education" as was observed for the Quality of Student items, i.e., the greater the number of graduates the more reported change. However, the item "graduate teacher education program" did not follow the pattern. Institutions with 500-2,500 graduates were more similar to institutions with a smaller number of graduates than to the moderate groups. Thus, the change status for larger institutions is less than would be expected for this item. No immediate explanation seems clear for this observation.

Three of the seven items under Support of Program were significant beyond the .05 level. They were "faculty/staff development," "research in teacher education," and "administrative reorganization." In all cases the same consistent pattern was evident; the larger the number of graduates the more change reported.

Chi square analysis of items regarding teacher certification and impact of teacher certification did not produce significant differences across groups. Neither did the analysis of variance procedure produce significant differences across groups for mean rating of items regarding influence of groups on teacher certification.

In summary, there were some differences as to the value of items as they influence quality of teacher education graduates. However, with the exception of the "research in teacher education" item, the value of the item reported by groups was not consistent with the change status reported across groups. For example, "pre-student teaching" was found to differ across groups with respect to ranking this item higher. However, the status of change data suggests that more change is occurring in programs where the graduating class is larger.

Table 21

RELATIONSHIP BETWEEN STATUS OF ITEMS
AND ESTIMATED NUMBER OF TEACHER EDUCATION GRADUATES

ITEMS	Elementary x^2	Elementary p	Secondary x^2	Secondary p
"QUALITY OF STUDENT"				
1. Test of basic skills	22.67	.012*	22.65	.012*
2. Increase in GPA	18.32	.049*	18.60	.045*
3. Affective or Attitudinal measures	7.54	.673	8.35	.5938
4. Change in exit standards	13.81	.181	15.32	.120
"QUALITY OF PROGRAM"				
1. Teacher education course content	12.22	.270	8.68	.562
2. Teacher education program reorganization	17.29	.070	14.71	.142
3. Pre-student teaching field experience	23.58	.008*	18.79	.043*
4. Student teaching supervision	6.77	.746	6.79	.744
5. Increased hours for teacher education	16.73	.080	16.56	.084
6. Graduate teacher education program	18.73	.043*	19.90	.030*
7. Inservice teacher education program	22.11	.014*	23.50	.009*
8. Internship or 5th year program	13.00	.223	10.26	.417
9. Induction program for new teachers	9.68	.468	10.68	.382
10. Teacher education program evaluation	13.02	.222	12.87	.231
11. Faculty	16.88	.076	17.30	.067
"SUPPORT OF PROGRAM"				
1. Faculty/staff development	19.17	.038*	18.25	.050*
2. Administrator/faculty relations	18.18	.051	17.06	.072
3. Coordination with academic disc.	11.69	.306	11.36	.330
4. Coordination with field based ed.	18.22	.051	13.32	.205
5. Conduct of research in Teacher Ed.	21.08	.020*	25.37	.004*
6. Administrative reorganization	42.26	.000*	38.69	.000*
7. Increase in financial resources	8.10	.618	8.23	.606

1. n = 239

* = significant at or beyond .05 level

Overall, the larger the graduating class the more reported change in Quality of Student, Quality of Program and Support of Program items. Caution should be exercised in interpreting these findings. The issue of quality of the teacher education program and/or quality of graduates from these programs was not measured and may not be inferred. Only the status of item change was

requested to determine the relationship of size of graduating class to amount of change occurring or planned. In this regard, the relationship appears clear.

Funding Status (Private or Public)

The funding status of public or private was included in the questionnaire to allow these sub-groups to be compared. It should be noted that there was a strong relationship between funding status and size of graduating class. This relationship is readily observed from Table 22. While there were some similar findings for size of graduating class and funding status, there were also differences. Thus, funding status will be dealt with as an independent variable.

The mean difference for items was tested between private institutions and public institutions using the t-test for independent groups. Seven of the 22 items had mean differences significant beyond the .05 level. As was the case with size of graduating class, "attitude or affective measures" was perceived differently, and private institutions ranked this item higher (more important). Three items under Quality of Program were significant: Pre-student teaching, student teaching, and faculty. All three items were perceived as relatively more important by the private institutions. The Support of Program items having significantly different mean item rankings were "administrator/faculty relations," "coordinating with other disciplines," and "research in teacher education." Again the first two items were ranked higher and thus perceived as more important by public institutions. "Research in teacher education" also was ranked higher by the public institutions. These rankings are summarized in Table 23.

Table 22

CROSSTABULAR PRESENTATION OF PRIVATE VS. PUBLIC SUPPORT AND NUMBER OF TEACHER EDUCATION GRADUATES

	NUMBER OF TEACHER EDUCATION GRADUATES											
	0-50		51-130		131-300		301-499		500-2500		NR	
FUNDING STATUS[1]	f	%	f	%	f	%	f	%	f	%	f	%
Private	57	52.3	39	35.8	11	10.1	1	0.9	1	0.9	0	0
Public	7	5.7	21	17.1	48	39.0	23	18.7	22	17.9	2	1.6

1. Private n = 109, Public n = 123, Missing n = 7

2. $x^2 = 108.55$, P = .000

Table 23

COMPARISON OF RANKING OF ITEMS FOR PRIVATE VS. PUBLIC STATUS

ITEM	PRIVATE	PUBLIC	t	p
"QUALITY OF STUDENT"				
1. Test of Basic Skills	2.09	1.94	0.90	.370
2. Increase GPA	2.51	2.48	0.17	.862
3. Attitude or Affective Meas.	2.90	3.30	2.32	.022*
4. Exit Standards	2.34	2.30	0.27	.785
"QUALITY OF PROGRAM"				
1. Teacher Ed Course Content	2.30	2.76	1.87	.064
2. Teacher Ed Prog. Reorg.	4.17	4.14	0.07	.947
3. Pre-Student Teaching	3.21	4.47	3.51	.001*
4. Student Teaching	4.34	5.12	2.06	.041*
5. Increased Hours for T.E.	6.03	6.32	0.59	.556
6. Graduate T.E. Program	6.90	6.37	1.14	.258
7. Inservice T.E. Program	7.31	6.88	0.89	.375
8. Internship or 5th year	7.92	7.40	0.96	.338
9. Induction for new Teachers	7.24	7.46	0.43	.666
10. T.E. Prog. Eval.	4.50	4.86	0.81	.422
11. Faculty	3.52	4.78	2.23	.027*
"SUPPORT OF PROGRAM"				
1. Faculty Development	2.20	2.56	1.58	.117
2. Admin/Faculty Rel.	4.09	4.78	2.30	.023*
3. Coop. W other discip.	2.94	3.52	2.34	.021*
4. Coop. W Field Educators	2.91	3.07	.065	.518
5. Research in Teacher Ed.	4.96	4.02	3.13	.002*
6. Administrative Reorg.	5.21	5.21	0.01	.989
7. Increase in Finances	3.93	3.37	1.56	.121

The analysis of change status comparing private and public institutions produced significant chi square values for 10 of the 22 items. Table 24 contains these data.

Table 24

RELATIONSHIP BETWEEN STATUS OF ITEMS AND PRIVATE VS. PUBLIC STATUS

ITEMS	Elementary x^2	Elementary p	Secondary x^2	Secondary p
"QUALITY OF STUDENT"				
1. Test of basic skills	5.37	.068	8.39	.015*
2. Increase in GPA	6.77	.033*	10.76	.004*
3. Affective or Attitudinal measures	4.73	.093	4.47	.106
4. Change in exit standards	7.62	.022*	5.51	.063
"QUALITY OF PROGRAM"				
1. Teacher education course content	5.15	.075	3.66	.159
2. Teacher education program reorganization	6.75	.034*	6.01	.049*
3. Pre-student teaching field experience	1.40	.494	1.25	.533
4. Student teaching supervision	2.25	.324	0.88	.643
5. Increased hours for teacher education	0.59	.744	0.10	.946
6. Graduate teacher education program	0.32	.848	1.36	.504
7. Inservice teacher education program	12.78	.001*	15.23	.005*
8. Internship or 5th year program	4.37	.112	4.03	.133
9. Induction program for new teachers	11.16	.003*	10.95	.004*
10. Teacher education program evaluation	2.50	.286	3.17	.204
11. Faculty	1.26	.531	.65	.720
"SUPPORT OF PROGRAM"				
1. Faculty/staff development	10.13	.006*	9.64	.008*
2. Administrator/faculty relations	4.31	.115	5.65	.059
3. Coordination with academic disc.	1.86	.393	3.12	.209
4. Coordination with field based ed.	6.12	.046*	7.00	.031*
5. Conduct of research in Teacher Ed.	11.64	.003*	13.03	.005*
6. Administrative reorganization	12.63	.001*	10.63	.004*
7. Increase in financial resources	2.29	.317	3.36	.185

1. n = 239

* = significant at or beyond .05 level

Three of the four Quality of Student items produced signigicant chi square values. "Test of basic skills" was significant for the secondary program only and suggests that more changes have occurred at public institutions than at private, but planning for change was equally evident. "Increased GPA at entry" was significant for both elementary and secondary programs and indicated that more public than private institutions were planning for change and had changed on this item. For the item "exit

standards," only the elementary programs data were significantly different and the crosstabulation of data suggested planning for change was more frequently indicated by public institutions.

Three items under Quality of Programs had significant chi square values. Again, public institutions indicated more planned change and recent change for "teacher education program reorganization" and "inservice teacher education program." The item "induction program for new teachers" obtained responses which suggested that recent changes, while quite small, were about equal for public and private institutions. However, public institutions indicated planning more change in this area.

The differences between private and public institutions were quite evident for Support of Program items with four of the seven items having a significant chi square value. The crosstabulation of variables was consistent for these four items with public institutions reporting more change occurring in the planning change and recent change categories. These items were "faculty/staff development, "coordination with field based educators," "research in teacher education," and "administrative reorganization."

The comparison of private and public institutions did not produce significant chi square values for items relating to change in teacher certification. One significant t-value was obtained when the comparisons of private and public responses were made for influence group data. Both public and private institutions viewed parent groups as only slightly influential on the teacher certification process, but public institutions judged the amount of influence to be marginally stronger (mean rating of private = 2.01, mean rating of public = 2.31, $t = 2.08$, $p = .039$).

In summarizing the analyses of private and public status, it is again important to emphasize that these analyses do not reflect the degree of quality of existing programs the program graduate. These analyses were made to determine if probable differences existed between public and private institutions with regard to: (a) perception of item value as indicated by ranking the items; (b) change status of the items; and (c) perceptions of state teacher certification change and influence groups.

It again appears that the group differences on mean ranking of the items were not consistent with reported practice, except for the item on research. The private institutions tended to rank statistically significantly different items higher, and more important. Public institutions reported more alterations occurring in the categories of planning change and recent change.

STATE MANDATED TEACHER COMPETENCY TESTING FOR CERTIFICATION STATUS

In his study, Sandefur (1982) classified states by mandated teacher competency assessment of teachers. He grouped states into three categories: states with mandated competency assessment programs, states planning competency assessment programs and states inactive in this area. Furthermore, he indicated whether these mandates were in admissions, teacher certification, or both. Sandefur's state classification study was relevant to this task force survey because the survey sampled and analyzed institutions by state.

Using Sandefur's classification data, it was possible to place institutions into two groups. By grouping states by geographic location, recent mandated changes in teacher competency assessment for certification could be used as an independent variable. Table 10 (located in Chapter 3) shows those states with "*" were classified by Sandefur as having state mandated teacher competency assessment for teacher certification programs.

The question was addressed of whether responses to questionnaire items differed for institutions in states mandating competency assessment for certification programs and institutions in states without such requirements. While states were not selected in regard to teacher certification mandates, eight states coincidentally had mandated competency assessment for teacher certification and eight states did not.

Table 25 presents the mean ranking of items. "Tests of basic skills" was viewed as more important by the with-mandate group. "Pre-student teaching field experience" and "increased hours for teacher education" differed between groups. The pre-student teaching item was ranked higher by the without-mandate group, and the increased hours item was considered more important by the with-mandate group.

Support of program items also differentiated the two groups. The without-mandate group perceived "coordination with field based educators" as most important, while the with-mandate group ranked "increase in financial resources" as most important. Again the responses to these items were somewhat inconsistent because missing data and non-responses to items were prevalent. However, the obtained data seem to point out that institutions under state mandate perceive a more urgent need for increased number of hours and increased funding for teacher education.

Chi square analyses produced both expected and unexpected findings. Three of the Quality of Student items had significant chi square values. As expected, the with-mandate group generally indicated more change and planning for change, except for planning a GPA increase at entry. The without group reflected a slightly higher percentage of institutions planning for GPA increase.

Analyses of the Quality of Program items produced some unexpected findings. Four of the items had chi square values significant beyond the .05 level, but only one item had significant chi square values for both elementary and secondary. "Teacher education program reorganization" was significant for the elementary program only and the without-mandate group had a higher percentage of responses in the change occurred category. The planning for change slightly favored the mandate group.

Table 25

COMPARISON OF ITEM RANKS FOR INSTITUTIONS WITH STATE MANDATED COMPETENCY ASSESSMENT FOR CERTIFICATION AND INSTITUTIONS WITHOUT STATE MANDATED COMPETENCY ASSESSMENT FOR CERTIFICATION

ITEM	MEAN WITHOUT MANDATE	MEAN WITH MANDATE	t	p
"QUALITY OF STUDENT"				
1. Test of basic skills at entry	2.20	1.86	2.15	.033*
2. Increase in GPA at entry	2.46	2.52	0.34	.731
3. Affective or attitudinal measures	3.10	3.16	0.33	.743
4. Change in exit standards	2.33	2.32	0.10	.919
"QUALITY OF PROGRAM"				
1. Teacher education course content	2.50	2.58	0.34	.732
2. Teacher education program reorganization	3.71	4.55	1.94	.054
3. Pre-student teaching field experience	3.26	4.35	3.02	.003*
4. Student teaching supervision	4.44	5.03	1.57	.119
5. Increased hours for teacher education	6.96	5.67	2.71	.007*
6. Graduate teacher education program	7.30	6.26	1.96	.052
7. Inservice teacher education program	6.90	7.17	0.57	.567
8. Internship or 5th year program	8.12	7.31	1.51	.135
9. Induction program for new teachers	7.27	7.44	0.33	.739
10. Teacher education program evaluation	4.44	4.78	0.76	.446
11. Faculty	4.39	4.11	0.50	.618
"SUPPORT OF PROGRAM"				
1. Faculty/staff development	2.45	2.36	0.41	.686
2. Administrator/faculty relations	4.53	4.49	0.15	.884
3. Coordination with academic disciplines	3.05	3.47	1.73	.085
4. Coordination with field based educators	2.67	3.23	2.34	.020*
5. Conduct of research in Teacher Education	4.40	4.44	0.12	.902
6. Administrative reorganization	4.86	5.39	1.56	.122
7. Increase in financial resources	4.19	3.22	2.76	.006*

* mean difference significant beyond .05 level

The same pattern held for the item "Student teaching supervision." For both elementary and secondary programs, more change had actually occurred for the without-mandate group, yet the with-mandate group had the higher percentage of responses in the planning for change category.

The items "increased hours for teacher education" and "teacher education program evaluation" had significant chi square values only for the secondary programs. In the change occurred category, percentages were similar for the two groups, but the with-mandate group again had a higher percentage of responses.

Finally, under Support of Program, the two items "coordination with academic disciplines" and "increase in financial support" had significant chi square values across elementary and secondary programs. The pattern of more planning by the with-mandate group and slightly more reported change by the without mandate group was evident for the "coordination with academic disciplines" item. The "increase in financial support" item had a somewhat different pattern with the planning being slightly favored by the with-mandate group. The change occurred category was quite different for the two groups. About 14% of the without-mandate group reported recent increases in financial support, but only about 3% of the with-mandate group reported increases in this area.

The groups were surprisingly similar in their responses to the teacher certification items, and no significant chi square values were obtained. One significant t value was obtained for influence on certification items. The with-mandate group perceived a greater legislator influence on teacher certification than did the without-mandate group (with-mandate group mean rating = 3.79, without-mandate group mean =3.05, $t = 4.36$, $p = .000$).

Responses to the Quality of Student items were generally as expected with the with-mandate group reporting more planning for change and actual occurrance of change. It appears that the mandated changes in state certification have had an influence on the entry and exit criteria for teacher education programs. However, the pattern of response that emerged for the items under Quality of Program and Support of Program was unexpected. The general pattern that suggested that in states where competency assessment for teacher certification was mandated, institutions were more engaged in <u>planning</u> for change. For institutions where no state mandate for competency assessment was in effect, a higher percentage of <u>reported change</u> was found.

This difference in reported change is difficult to explain. However, the difference in planning may be due to recent changes in state mandates. In most of the states where mandated change in teacher certification has occurred, a timetable has been established. Most of the states are now in the transition phase (i.e., mandates will not be in effect until 1984 or later), and this partially explains the large amount of planning occurring at these institutions.

The item on "increase in financial resources" was particularly interesting. The with-mandate group ranked this item much higher (more important). The chi square analyses indicated that only about 3% of the with-mandate institutions had recently received increases in financial resources, while nearly 14% of the without group had recently received such increases. Most of the states in the with-mandate group were from the southeast and southwest whereas the institutions in the without-mandate group were from the Northeast, Midwest and Northwest. A lucrative area for further investigation may be the study of funding patterns of states in these sections of the country. Such a study could include an examination of the relationship of funding to quality issues.